ELECTRICAL SOUTH

Serving the 18 Southern and Southwestern States

Revamping electric distribution in existing textile mills—pg. 22

FEBRUARY, 1956

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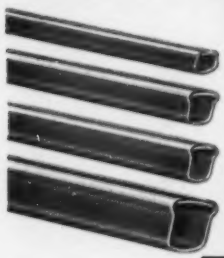

200
500
700
1000

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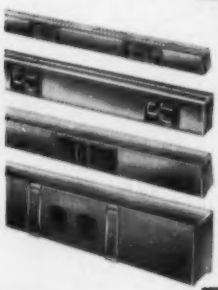

1900
2000
2100
3000

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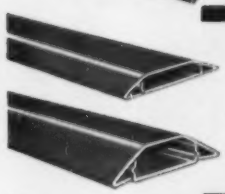

1500
2600

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21A
21AR
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41SW

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- Mounting base of interior provided with keyhole slots to fit over 4 studs of back box for quick easy installation.
- All wire terminals are provided for straight-in wiring. No looping of wires necessary.
- With interior completely separate from front cover loss of time in fitting cover around fuse blocks and adjusting for irregularities in wall are eliminated.

100 200 AMPERE

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8 to 32 Plug Fused Circuits

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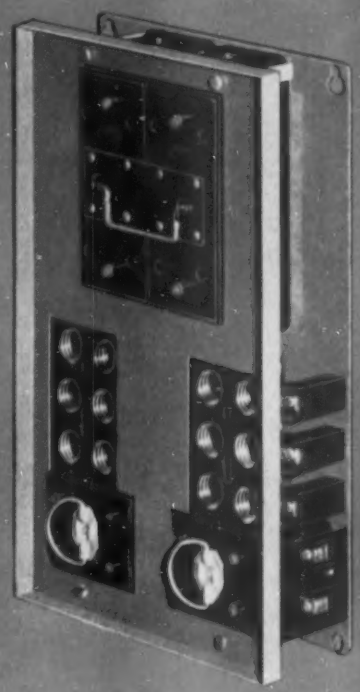

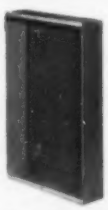

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FRONT COVERS Surface or Flush Mounting

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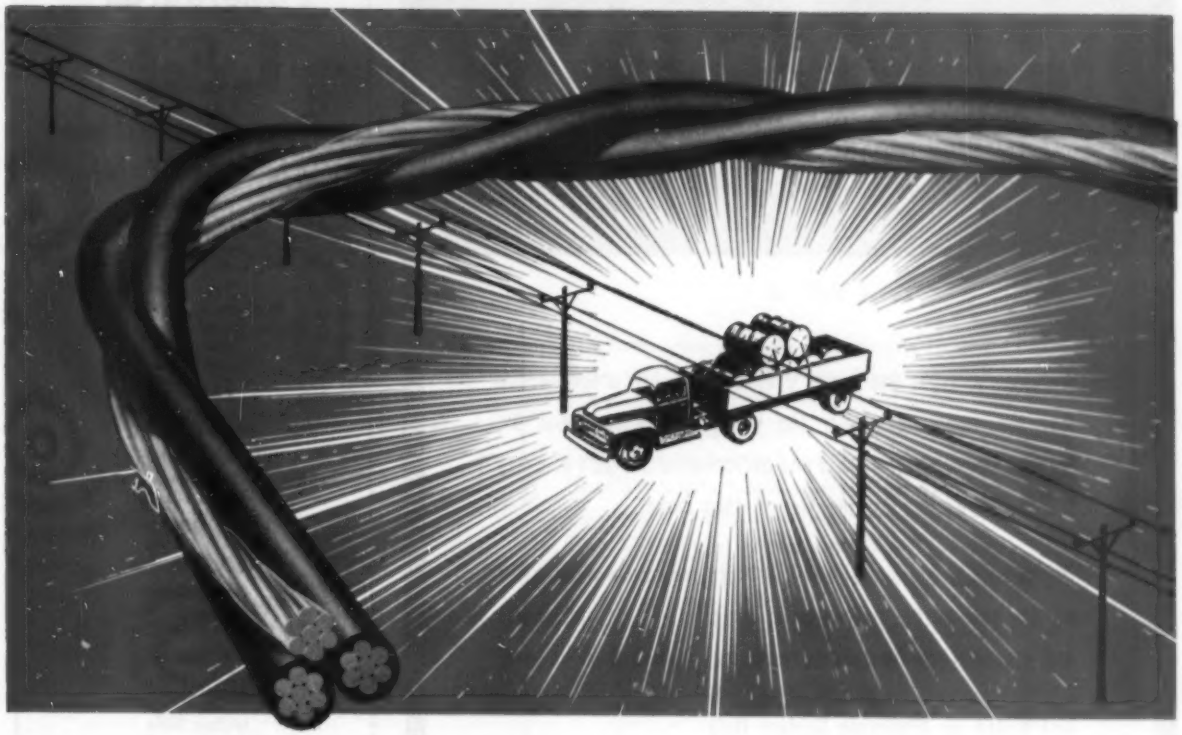
Volume 36 Number 2

Southwire means service



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TO HELP THE BUSY READER

Electrical heating systems for homes continues to attract the attention of electrical contractors—especially since the utility companies in the South have begun to take a more favorable view of this type of load. A story beginning on **page 18** tells of one contractor who is specializing entirely in this work.

The **revamping of low voltage distribution** systems in existing textile mills requires careful planning and special studies such as fault current analyses. An expert in this field reviews the problem in an article beginning on **page 22.**

Many people in the electrical industry believe that **home lighting** has been neglected. Now, a test program conducted by utilities in Kansas and Mississippi shows conclusively that home lighting sales can be boosted by coordinated sales programs. **See page 26.**

A review of some of the **AIEE papers** of more general interest presented at the Winter Meeting will be found beginning on **page 41.**

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Economic comment

by J. Whitney Bunting, Ph.D.

Creative thinking

A new field of philosophy with tremendous commercial and economic possibilities has recently been born. This field, called "creative thinking" by its proponents, realizes the significance of group dynamics in searching for new ideas or for new means to tackle and solve old problems.

The remarkable feature of the idea is that many persons who have felt that their mental processes were particularly lifeless have found that this new technique provides them with a whole new outlook on life. Their ideas may at first be based upon old environmental factors. However, several group sessions with new ideas being offered by all members soon sharpens the creative urge, and the results are new ideas, new products, or new processes.

This idea is not too new in the area of science and engineering where creative thinking has led to many of the modern day conveniences one now considers routine. However, in other areas, such a the solution of business and economic problems, it is not only a new concept but one that is most invigorating.

Dean James E. Gates, of the College of Business Administration, University of Georgia, has been a strong proponent of the "creative thinking" concept and, in the past two years, has passed along his enthusiasm to many educators and businessmen.

Creative Thinking, Inc.

A recently established New York organization, entitled "The Very Idea, Inc.," is striving to make creative thinking a full-blown production business. They plan to offer themselves to the small businessman, with a myriad of problems, and agree to pool their thinking resources to his benefit. The results of their group thinking has been so phenomenal that all agree this new concept could be a boon to all types of business enterprise.

As the idea takes hold and more and more people become enthusiastic converts to creative thinking, there should be a tremendous release from routine and standardized procedure. And above all, anyone can play the game if he is willing to allow his thoughts to run rampant in the search for new ideas.

Contributions to schools

Most businessmen of today know of the importance of corporate contributions to education. They realize that the maintenance of a good system of higher education can benefit them directly in three basic ways:

1. By providing an alert and intelligent mapower pool for their business enterprises;

2. By providing a good economic, social, and political climate in which our present type of economic activity can best breed and prosper; and,

3. By ever expanding the markets for merchandise produced, since a better educated manpower tends to have a higher per capita living standard and thus a greater demand for foods and services.

The recent Ford Foundation grant of 500 million dollars to educational and medical institutions was a dramatic example of one industry's response to this need. Of this amount some 300 million dollars was directed toward endowment use by colleges for raising faculty salaries. This is a tremendous contribution and, historically, is the greatest philanthropic single grant.

Yet the average college teacher can expect a salary increase of less than $200 per year or about $16.67 per month. This is not intended to diminish the importance or value of the Ford donation because it is certainly symbolic of (a) what must be done, and (b) the immensity of the educational financial problem facing the nation.

Two billion needed

Just to keep pace with current living costs and adjustments salary-wise in other fields of endeavor, it would cost the nation for faculty salaries alone approximately 2 billion additional endowment dollars. There is no single business corporation or foundation that can provide this immense sum.

Some change in tax requirements might help, but it still must take the concentrated effort of all American business, great and small, to effectively mass the endowment money necessary to provide proper support for higher education in this nation.

Too many businesses believe that this is not their problem, or, that a token contribution will suffice. Quite frankly this type of reasoning is outdated, for the very life blood of our national and industrial health is dependent upon the proper financial solution of higher education's problems.

Colleges are turning to industry and business more and more. Their administrators realize the seriousness. Yet business frequently responds only on the grounds of public relations. Grants, properly made to colleges and universities, are insurance against economic climates that could work to lessen the opportunities for business and industrial progress.

Dr. Bunting is a well-known economist and educator having special knowledge of the South.

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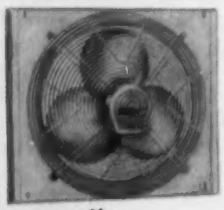

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Electrically Reversible
PUSH BUTTON
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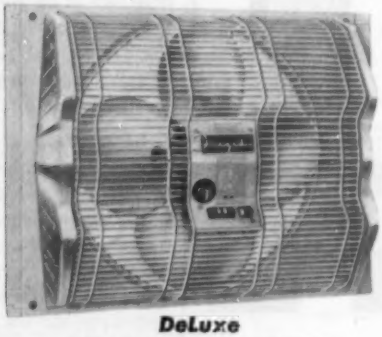
WINDOW FAN



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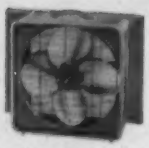
New! **FRIGID** Designed for extra service and greater value.



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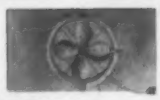

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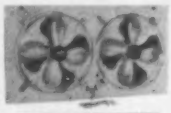

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3 tools do all hand bending jobs of both rigid Conduit and EMT

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One piece—with solid non-skid hook

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CATALOGS and BULLETINS

Available Free to Readers of Electrical South upon Request

1048—Plug-in Strip
An illustrated catalog showing the complete "Plug-in" Strip line has recently been published by National Electric Products Corp., Pittsburgh, Pa. This eight-page illustrated brochure pictures the three and six foot tsandard lengths of the multi-outlet branch circuit assembly.

1058—Conductor Fittings
A handy, pocket-size catalog of their complete line of conductor fittings is available from Penn-Union Electric Corp., Erie, Pa. The 80-page catalog is thoroughly indexed and also has handy locator tabs for extra speed in use. Specifications and illustrations of each item are included.

1076—Modular Lighting
A 20-page booklet containing interesting and useful information about the "modular system" of lighting can be obtained by writing to the Mitchell Manufacturing Co., 2525 Clybourn Ave., Chicago 14, Ill.

1086—Cable Connectors
Tomic Sales and Engineering Co., 4864 Woodward Ave., Detroit 1, Mich., now have available catalog sheets containing data on the complete line of their connectors, couplings, and cable connectors.

1088—Fittings and Fixtures
A 32-page illustrated catalog covering Killark fittings and fixtures is offered by Killark Electric Mfg. Co., Vandeventer and Easton Aves., St. Louis 13, Mo.

1090—Midget-Size Busduct
Complete information on Power Plugin, the new, midget-size busduct, is found in bulletin No. 720, available from Frank Adam Electric Co., 3650 Windsor Pl., St. Louis 13, Mo.

1092—Electrical Boxes
Steel City Electric Co., 1207 Columbus Ave., Pittsburgh 12, Pa., offers a catalog of their complete line.

1130—Conduit Fittings
The latest completely illustrative catalog on their diversified line of conduit fittings is announced by the Atlantic Conduit Fittings Co., 589 Atlantic Ave., Boston 10, Mass.

1136—Space Heating Guide
Cavalier Corp., Chattanooga 2, Tenn., has prepared a Guide for Calculations of Electric Space Heating. It is based on study of several thousand installations of electric heat and is a handy reference for calculating electric heating requirements and estimating operating costs. The booklet contains discussion, charts, and floor plan examples.

1150—Fluorescent Fixtures
Light & Power Utilities Corp., 1035 Firestone Blvd., Memphis, Tenn., has printed a new catalog of fluorescent lighting fixtures. The new catalog is divided into six sections, each printed in its own distinctive colors. First section is devoted to "General Data" and details of L&P manufacturing.

1166—Electrical Fittings
A 40-page illustrated catalog and price list on the Gedney line. Shown and listed are conduit, threaded entrance, SEC, EMT and ground fittings, and box connectors for both ormored and non-metallic cable. Copies are available from Gedney Electric Co., RKO Bldg., Radio City, New York 20, N. Y.

1178—Remote-Control Wiring
Bulletin 16-200 is a 36-page manual describing layout and installation of remote-control wiring, and is available from General Electric Co., Construction Materials Dept., Bridgeport 2, Conn. Advantages and explanation of the system are followed by illustrated installation procedure.

1184—Approved RHW Wire
Bulletin No. 1018 describing first Underwriters' Approved Type RHW Wire, developed to meet the new National Electrical Code standards, is available from Simplex Wire and Cable Co., 79 Sidney St., Cambridge 39, Mass.

1190—Electrical Fittings
Blackhawk Industries, Dubuque, Iowa, offers a complete catalog of electrical conduit and cable fittings. Also, a special publication giving detail drawings and instructions for installing service entrance masts on low or ranch type buildings.

1192—Wire Pulling Lubricant
Illustrated six-page folder showing the advantages of an improved Y-Er Eas wire pulling lubricant is available from Electro Compound Co., 3812 150th St., Cleveland 11, Ohio.

ELECTRICAL SOUTH
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February, 1956

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1220	1224	1228	1230	1238
1240	1242	1244	1248	1250
1252	1254	1258	1260	1262
1264	1266			

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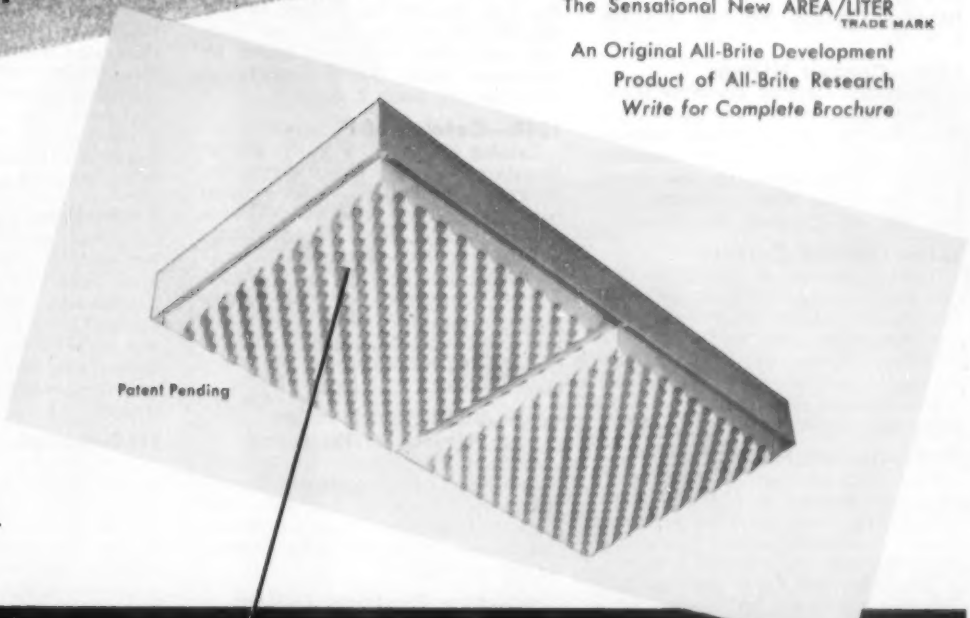

Patent Pending

All-Brite's new main plant at South San Francisco—largest and most modern in the West — now expanding to over 100,000 square feet.

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1200—Fluorescent Fixtures

Complete information on commercial fluorescent and incandescent ligthing of all types, for offices, schools, libraries, etc., and all industrial locations available from Benjamin Electric Manufacturing Co., Leader Div., Northwest Highway, Des Plaines, Ill.

1202—Code Explanation

Bulletin 2660 contains up-to-date information (following 1953 Code revision) on why equipment for hazardous locations is designed and built as it is, and is available from Crouse-Hinds Co., Wolf & 7th, No., Syracuse 1, N. Y.

1204—Conduit Fittings

Illustrated Catalog available upon request to Electrical Fittings Corp., Woodside, N. Y., o rtheir nearest warehouse in your locality contains complete information on the company's electrical conduit fittings, conduit nipples, couplings, and elbows.

1214—General Catalog

General catalog of Royal Electric Co., Inc., Pawtucket, R. I., covering flexible service and lamp cords, cord sets, extensions, trouble lights, wiring devices and decorative Christmas lighting is available to wholesalers. Dealer catalogs may be secured from Royal distributors.

1218—Carbon Products

A 28-page catalog on Motor and Generator Brushes and carbon products telling how to order brushes, grade recommendations characteristics and description of brush grades is available fro mthe Helwig Co., 2536 North 30th St., Milwaukee, Wis.

1220—Stadium Lighting

The Pyle-National Co., 1334 N. Kostner Ave., Chicago, Ill., announces the availability of a new eight-page bulletin, No. 605, on stadium lighting, describing in detail floodlighting of a typical outdoor athletic arena stressing the importance of using fully enclosed floodlights.

1224—Electrical Equipment

The Wadsworth Electric Mfg. Co., Inc., Covington, Ky., has issued a new catalog Con 15-0 and Bulletin W. C. B. 53-1, containing data on their lines of Safety Switches, Service Equipment, Distribution Panels and "E-Z-RED" Circuit Breakers.

1228—Time Controls

A revised and enlarged edition of the booklet "How Time Controls Save Work, Time and Money on the Farm" has been announced by the Paragon Electric Co., Two Rivers, Wis. The revised edition includes new time control applications devoted to showing farmers how to earn more money by actually doing less work.

1230—Compression Connectors

An illustrated 18-page bulletin (13A) describes Squeezon compression connectors for all overhead distribution connections from line wire to ground rod. Offered by James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo., the bulletin also describes the mechanical and hydraulic installation tools required and tells where to use each.

1238—Selecting Fuses

A 12-page descriptive handbook "Fuseology" tells how to get safest, most dependable, trouble-free electrical protection from fuses. Contains useful information on selecting right size and type of fuses—how to stop needless blows—avoiding poor contact and other troubles. Issued by Bussmann Mfg. Co., University at Jefferson, St. Louis 7, Mo.

1240—Catalog of Fixtures

Catalog No. 9 of Prescolite Manufacturing Corp., 2229 Fourth St., Berkeley 10, Calif., available upon request, contains attractively drawn illustrations of fixtures and scale drawings of their dimensions, as well as descriptive information and suggested applications for each fixture in the Prescolite line. List prices of the fixtures in Catalog No. 9 is inserted as a separate sheet with each of the booklets.

1242—Distinctive Lighting Fixtures for the Home

Jay Lighting Manufacturing Company, Inc., 25 Quincy Street, Brooklyn 38, New York has available upon request a new six-page illustrated supplement featuring their fixtures for the home.

1244—New Electrical Fittings Catalog

Concise 36-page catalog illustrates and describes a complete line of electrical fittings, cable racks and wiring specialties. The catalog contains many detail drawings, clear-cut photographic illustrations of mast fittings, cable connectors, straps, hangers and ground clamps in a wide variety of types and sizes. For your free copy, write The M. & W. Electric Mfg. Co., East Palestine, Ohio.

1248—Conductor Armor

A new catalog of Superformed Armor Rods, Lineguards, Patch Rods, and Tap Armor describing various uses and applications of these products on overehad conductors is offered by The Fanner Manufacturing Company, Brookside Park, Cleveland 9, Ohio.

1250—Electrical Enclosures

Catalog No. 5354 currently being offered to the trade by B & C Metal Stamping Co., 590 Means St., N. W., Atlanta, Ga., is a well-organized, 66-page manual giving complete descriptive information, prices, and specifications on all items in the B & C line of electrical enclosures. Copies are available free of charge to electrical contractors.

1252—Conduit Data

Latest edition of their Conduit Data Booklet is now available from Pittsburgh Standard Conduit Co., 61 Bridge St., Pittsburgh 23, Pa. The booklet contains Code and Federal specifications, tables of electrical symbols, UL specifications, and several other tables of specific information about various types of conduit and components. The booklet is illustrated and contains a listing of Pittsburgh Standard agents in principal cities.

1254—Construction Anchors

"Anchoring for Power and Communication Lines," a completely illustrated manual on improving line construction with better anchoring, has been published by the Advertising Dept., the A. B. Chance Co., Centralia, Mo. The 25-page booklet shows how to install the right anchor at the right place in the right way.

1258—Drop light Reels

Catalog sheets on their complete line of 20, 30, and 40-foot Cordomatic drop light reels are available from Cordomatic, Div. of the Vacuum Cleaner Corp. of America, 1724 Indiana Ave., Philadelphia 32, Penna. All Cordomatic reels are made for wall or ceiling mounting and are UL approved.

1260—Lampholders

Multi Electric Manufacturing, Inc., 4223-43 W. Lake St., Chicago 24, Ill., has available copies of their Bulletin No. 555, which illustrates and describes the complete line of Multi Sparlites and accessories and fittings for these lampholders. Combination units are included.

1262—Fluorescent Fixtures

The new loose-leaf catalog recently issued by Southern Lighting Manufacturing Co., 501 Elwell St., Orlando, Fla., contains complete diagrams, specifications, and descriptions for all fluorescent fixtures which they manufacture. In addition to the information on commercial, industrial, and school fixtures, the catalog also lists hangers, troffers, troffer accessories, and incandescents which are available from the firm.

1264—Thiel Fasteners

Literature is now available on Thiel Easy Drive staples and other fasteners such as Hump Drive "Nail-Iits," "Grip Type" 1-hole pipe straps, hangers, etc. Write to Thiel Tool and Engineering Co., 1417 N. Market St., St. Louis 6, Mo.

1266—Metal-Clad Swiitthgear

Detailed information on metal-clad switchgear is now available in two special bulletins, 7004-B and 7004-C. These booklets give descriptions, application data and specifications on units up to 15 kv and 500,000 kva interrupting capacity. Write I-T-E Circuit Breaker Co., 19th and Hamilton Sts., Philadelphia 30, Pa.

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all **BURNDY** compression connectors for overhead lines may be installed with the Y35 HYPRESS including

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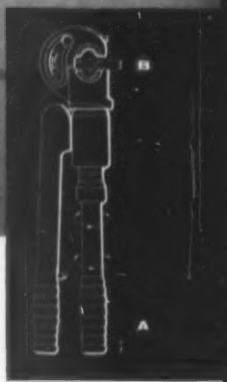
SIMPLIFIED DIE INSERTION — Identical interchangeable head and ram dies easily inserted and locked in position so that HYPRESS can be moved along connector without movement of dies.



QUICK RAM ADVANCE — Clockwise rotation of handle (A) moves die up to grip connector (B). Installation is completed by pumping until built-in overload valve clicks open. Trigger returns die to pre-set position.

Burndy developed and produced the first portable hydraulic HYPRESS in 1938. Experience and field usage since that time has made these features possible:

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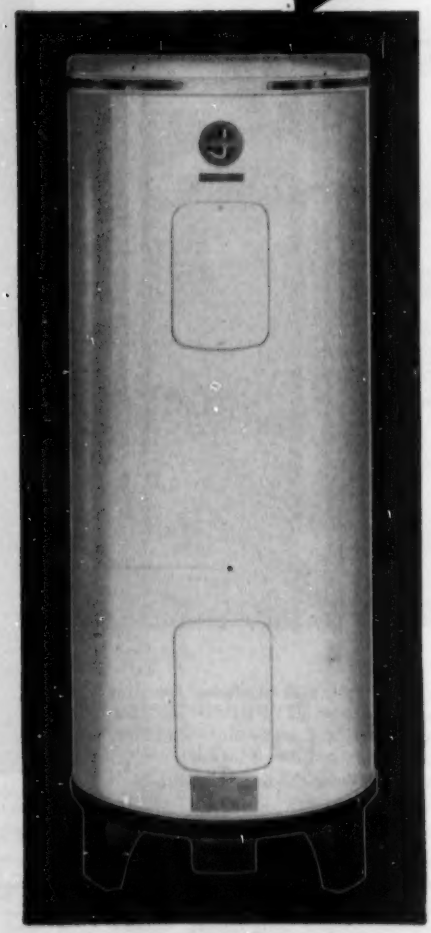
For further details or demonstration, contact your Burndy representative or write Burndy, Norwalk, Connect. — Toronto, Ontario for instruction manual.

BURNDY

55-6

It's good business to connect with Burndy ... FIRST name in electrical connectors; tools; methods

JACKSON'S 6 for '56



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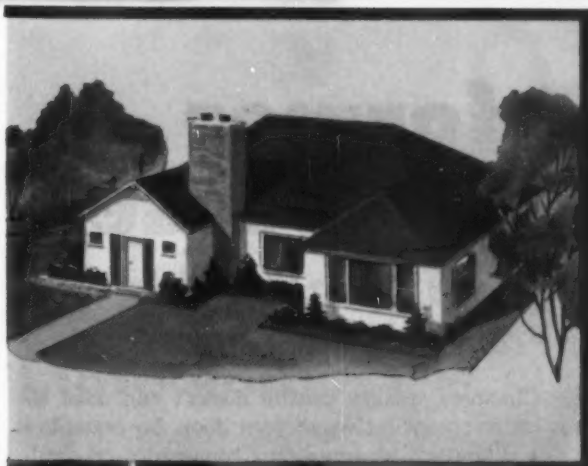
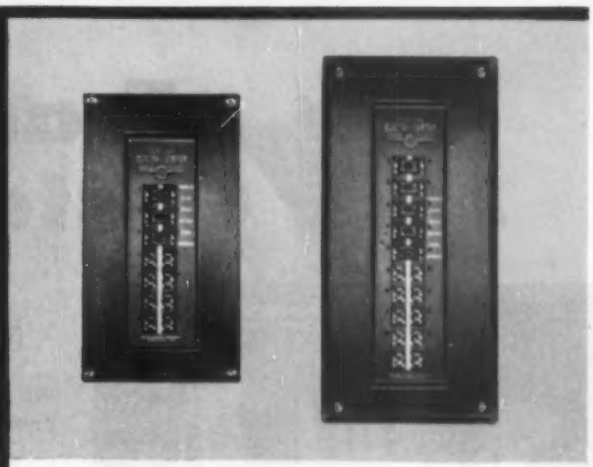
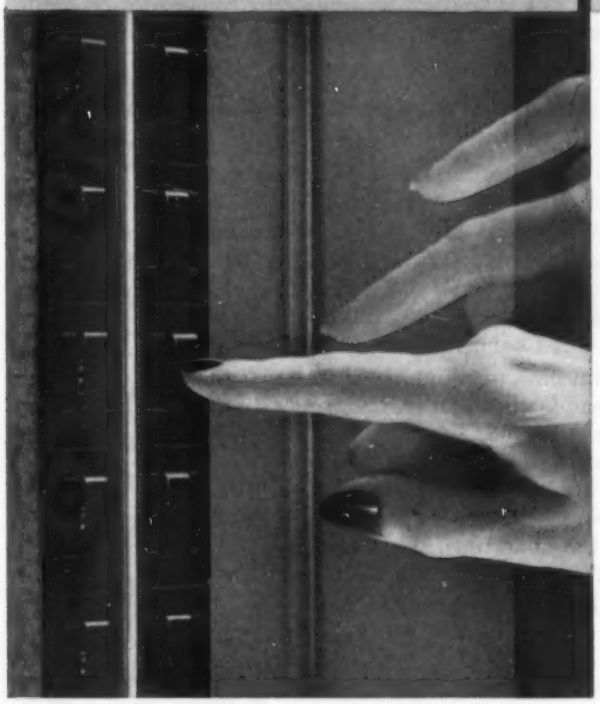




Catalog #XD-12 and #XD-18 Electri-Centers are compact, attractive. Serve 12 and 18 circuits respectively. Split bus design permits breakers in upper sections to handle up to four 220V, 2-pole appliances. One 2-pole Main Disconnect breaker controls all circuits in lower section.



Modern 100-Amp Panels for Modern Homes

—INSTALL BULLDOG PUSHMATIC ELECTRI-CENTERS

Better wiring means better living. And what better way to provide extra convenience and safety than with BullDog Pushmatic Electri-Centers®?

Every day more home owners recognize the need for wiring which is adequate to serve the increasing demands of modern electrical equipment. BullDog Electri-Centers are designed to serve those needs with greatest efficiency.

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They provide *Pushmatic dual protection* and *push-button convenience!* Duo-Guard Pushmatics® safeguard branch circuits *plus* lamp and appliance cords. And there's never a fuse to change—just a push restores service.

Easy to install, economical, modern, safe—Electri-Centers will add real zip to sales. For details see your qualified distributor or BullDog field engineer, or write BullDog Electric Products Co., Detroit 32, Michigan. © BEPCO

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NEW Transformer Obstacle Course

On this vibrating table, crated distribution transformers are tested for railroad car and truck vibrations. Equipment simulates varying speeds, irregularities in road or track, and natural frequency of truck springs.

Hinged platform drops packaged instrument transformers to steel plate from various heights. Package is positioned at desired angle of impact to test all edges and faces.

Assures Safe Shipment by Pretesting Package Design

At Allis-Chalmers, quality control doesn't end until the transformer shipment arrives at your door. An example is A-C's *new* equipment for simulating transportation conditions. It has a twofold benefit:

1. Provides information on safe crating and boxing.
2. Produces useful facts on improvement of transformer design.

It's assurance that transportation rigors will not affect transformer performance.

Previously A-C engineers traced test shipments over the country. This was time-consuming, but out of it came important results like A-C's floating load method of shipping transformers in 1952, and the pallet-bonus crate introduced by Allis-Chalmers in 1954.

But now, with this *new* shock-test equipment, results can be had faster and more accurately than before. Now, every newly designed transformer is shock tested in order to check its mechanical strength and prove the design calculations. At the same time, this "road test" checks the crate design for possible improvement.

A-4903

Impact test is equivalent to free drop to ground from back of truck or railroad car. Packaged unit slides down incline from a release point selected to produce impact equivalent to 9 G's . . . nine times acceleration of gravity. Shock recorder on crate measures initial impact.

Look for the seal on A-C transformer shipments which certifies approval by National Safe Transit Committee.

Allis-Chalmers complete package-testing program is just one of many steps A-C takes to produce better distribution transformers. It will pay you to get complete information. Why not call your nearby A-C office today? Or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

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"Stop crying... I told you to use a Circle F device!"

We at Circle F have long realized that a high "QSP" rating is most important to a growing business

- Top Quality so that customers can depend on your product
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Check the "QSP" rating before you buy—we at Circle F proudly boast that our "QSP" is among the highest.

A complete line of devices are available in each of the classifications shown. Write for more information.

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DUPLEX RECEPTACLE
Meets and Complies with
new National Electric Code
15 Amp.—125 Volts

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Meets and Complies with
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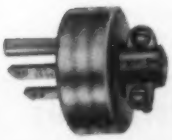

NO. 2527
TANDEM BLADE
ARMORED 3-WIRE CAP
Meets and Complies with
new National Electric Code

NO. 2517 B
PARALLEL BLADE
3-WIRE CAP
Meets and Complies with
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50 YEARS

TRENTON 4, N. J.

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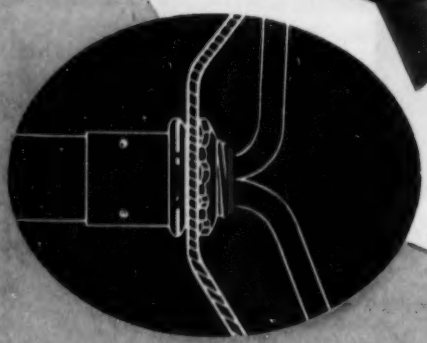
Eastern Insulated Wire Corp. Wallingford, Conn. A subsidiary

Red Throat

B-M 21 B, THE NEW INSULATED THROAT INDENTER CONNECTOR FOR E. M. T.

Four Ways Finer



1. Protruding rounded red plastic lip of bushing prevents cutting of insulation—eliminates shorts.
2. Full thread screws into all conduit fittings. Lip of RED THROAT bushing protects thread from damage.
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Briegel, the Original Indenter Fittings are neater in appearance, easier and faster to use. Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job!

ALL BRIEGEL FITTINGS ARE U. L. APPROVED AS CONCRETE-TIGHT

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All B-M Indenter Fittings are U.L. Approved as concrete-tight and for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

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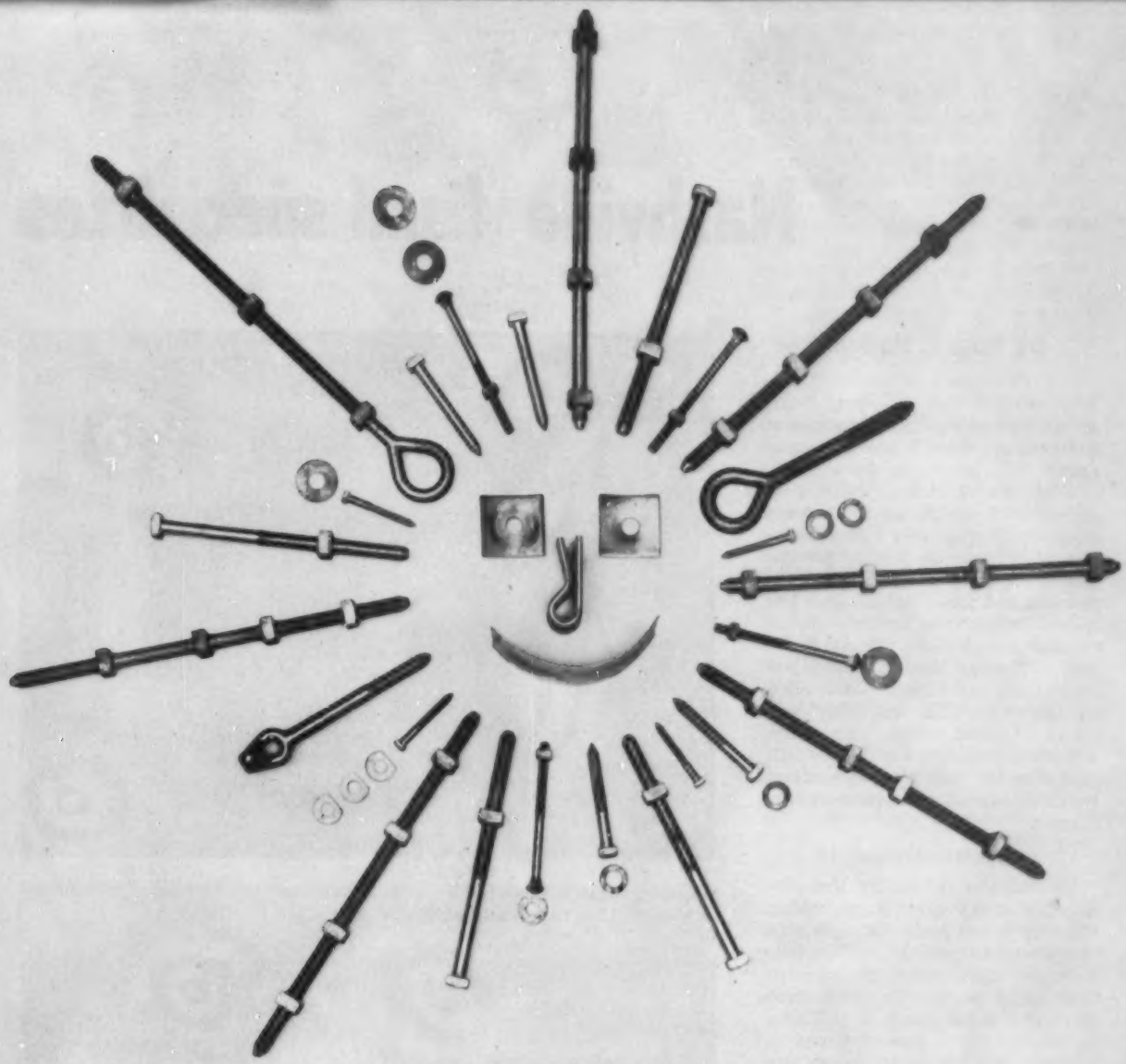

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These commonplace items . . . bolts and nuts, screws and washers . . . are the backbone of Hubbard's more than 4,000 items of pole line hardware. Back of each is more than a century's manufacturing experience. In each is the strength and durability, the uniformly high quality that has made Hubbard the leader of pole line hardware for industry.

Hubbard Pole Line Hardware is stocked by more than three hundred wholesalers . . . men whose business it is to know and service local needs. A call to your Hubbard distributor will bring his helpful assistance to your line construction needs.

QUALITY—FOR MORE THAN A CENTURY

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UNDERGROUND—Cable Racks • Manhole Ladders and Steps • Pulling-in Irons • Cable Shields • Screw Steelwing Anchors • Anchor Rods • Ground Rods and Clamps

HUBBARD AND COMPANY

Pittsburgh, 1, Pa.
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Nashville firm specializes

by Ross L. Holman

◆ "IN NINETY PER CENT of the new homes that I wire, I install electric heat."

When Bill Hitt first made that statement I wondered if he were exaggerating, or was I just hearing things? But on further investigation I learned that in some areas the demand for wired-in heat has ceased being a movement—it has become an epidemic. Official F. W. Dodge figures show that 85 per cent of all new homes constructed in the Nashville and Davidson County, Tenn., area are being wired for kilowatt fuel. Since Bill specializes in that kind of heating, I was convinced his statement was correct.

Southern trend

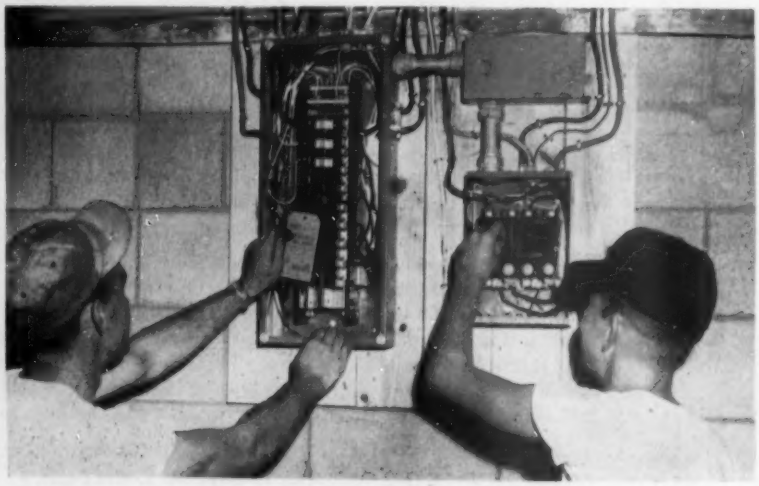
Nashville was one of the pioneering areas that began using electricity to revise the winter temperature upward. But Mr. Hitt believes that since it has so thoroughly proved its value here and a few other places, it will soon be one of the foremost types of contracting jobs all over the South. As it breaks into new territories, local contractors who are ready for it will find it one of their most lucrative sources of income.

The B. Hitt Electric Co., at Goodlettesville, Tenn., which is 12 miles from Nashville, wires 1,000 new homes a year, 900 of them for electric heat. Bill will install either one of two kinds according to preference. One is the wall type heater which is embedded in the wall of each room somewhat like the register of a hot air system. It has a neat bright color and adds to the architectural attractiveness of the surroundings.

Radiant cable

The other system is radiant heating. In this case the warmth is radiated by heavy electric cable similar to that used to heat hotbeds in gardening. The cable is looped back and forth across the ceiling with 1½ inches between loops. This cable is attached to the lathes by staples before the room is plastered. Then plaster is spread over the cable, leaving it completely covered. When the current is turned on the cable radiates heat through the plaster under thermostatic control, giving the room any temperature desired. It makes the surroundings delightfully comfortable.

Heating cable is installed by a Hitt mechanic on the ceiling of a house under construction, just before the plasterers come in.



Workmen check meter boxes at an electric heating installation.

in electric heat

The two types of electric heating which the Hitt firm installs are the wall heater type, above, and the electric heating cable.

In many areas both systems are just as economical as those fired by other fuels, to say nothing of their finger-tip convenience and cleanliness.

"Since residential air-conditioning became popular, electric heating has become practical in many areas of the country where it couldn't even get a toe-hold before," Mr. Hitt went on to explain. "Many private power companies shied away from heating and wouldn't encourage it at all. That was because heating put a terrific winter power load on the company without any compensating load during the summer. That meant they had to use some expensive generating facilities during the cold months that became useless in warm weather.

"But now the power demands for summer air-conditioning are rapidly balancing off any winter load that might be used for heating. It gives the power companies an evened-up year-round demand for power that they can count on."

Bill went on to say that since electric heat hasn't been promoted in some sections, people got the impression that it was prohibitive in cost except in the Tennessee Valley area, the Pacific Northwest, and a few other sections where the power rate for heating averages as low as ¾ cent per kwh. He showed that it is actually economical even as high as 2 cents per kwh in some places. Within this range practically every section of the U. S. might be able to use it, especially in the South where the average graded-down rate is less than in the country as a whole.

Exemplary experience

But, getting back to what electric contractors can expect from this new development as it penetrates their areas, Hitt's experience is worth looking over. Bill started his contracting operations in 1947, a year before electric heating began making much headway in his trade territory. He got in on the ground floor. He now has a brand new office with a stockroom in the rear. His stock consists of about an average month's supply of wall heaters, heating cable, and all the other supplies and tools contractors normally use in their work.

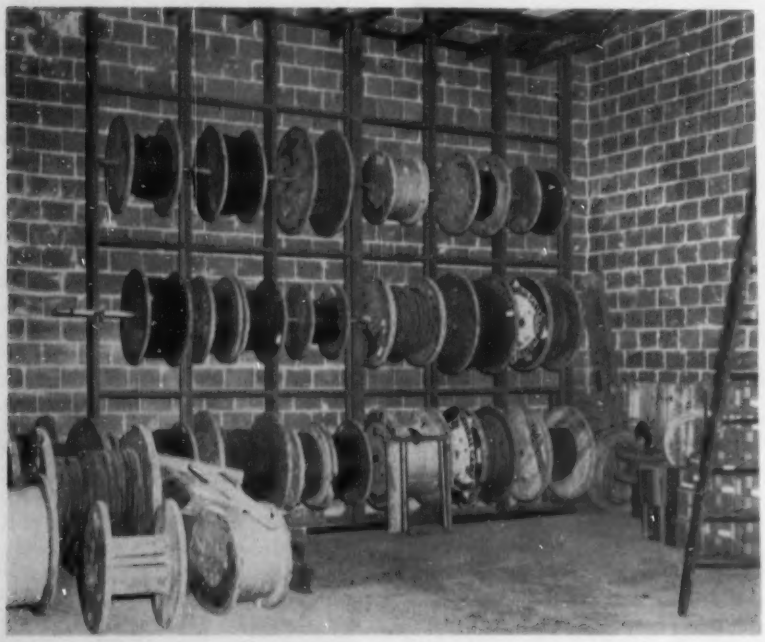
"Any efficient electrical contractor already established in business will have no trouble acquiring whatever new knowledge he will need when he takes on heating," said Bill. "Nearly all the distributors of heating equipment will not only give him all the technical know-how, but some of them will furnish a man to go around with him and help him promote it among prospective users."

Bill started out installing wired-in heat for individual home owners. He found prospects who were ready to use it if it was proved

(Continued on page 89)

Contractor's new quarters

New quarters were recently occupied by Burton Brothers Electric Co., Ft. Worth, Texas, electrical contracting firm.



This shop-built cable rack facilitates handling of large cables.

◆ WITH COMPLETION of their new building by Burton Brothers Electric Co., in Fort Worth, Texas, the brothers Burton—Jack E., president, and R. L. (Bob), vice president and superintendent—moved with their staff into a plant that had been planned and built to provide facilities and conveniencies particularly suited to the electrical contractor's activities.

Brother Jack gives Brother Bob practically all credit for the ideas incorporated into this new structure. In fact, from a practical viewpoint, Bob Burton did the planning to accommodate the time and labor saving departures he later installed.

Noval rack

One of these is the cable rack, which permits a man to strip off a required length of heavy cable, single-handed.

As the accompanying illustration indicates, the cable rack is a solidly-anchored frame of welded channel iron. Fabricators wanted $1,100 for the necessary channel iron, but Bob Burton found it at a much better price and, when he was finished, the completed rack had cost approximately $200.

In this rack, spools revolve freely because the pipe shafts are cradled in "keepers." These keepers are half-sections of larger pipe, properly spaced and welded securely to the frame. It was the original intent to use an electric hoist, suspended from top of the frame, for getting spools of cable into the rack. However, when the rack was complete, there was no room for this type hoist. So they plan to use an hydraulic hoist for this specific function, since such a hoist can be utilized otherwise in electrical contracting.

Explanation of another feature requires a review of parking facil-

built for efficiency

by Baron Creager

Jack Burton has visibility of all offices from his desk.

ities for the company's six pick-up trucks. As shown in another illustration, the west exposure of the shop features six ports into which each driver may back his truck. Immediately behind the line of trucks, when they are parked inside, a concrete apron eight feet wide extends the length of the shop, behind a step-high curb.

Behind the parked trucks, this apron terminates in a wall which provides leaning storage for all sizes of pipe conduit.

This wall was also designed by Bob Burton and installed under his supervision. It is eight feet high and the actual partition is of plywood. However, it, too, is mounted on a welded frame of channel iron and this frame is braced on the forward side, to resist dead weight of leaning pipe, with channel iron anchored to floor inserts. With this arrangement any man may back his truck into the chosen stall to load pipe of required size. The reverse side of the wall is used for small bin storage.

Burton Brothers also find that an elbow rack facilitates handling of such materials. This, too, was designed by Bob Burton and constructed in the shop, but the idea was borrowed from suppliers. Although such racks are used by wholesalers, the Burtons never saw one used by a contractor.

Bob Burton borrowed the idea for this elbow rack from wholesale suppliers with whom he deals. Most of his ideas were original.

Storage space

Burton Brothers, like many other contractors who build new plants, followed a design that gives them balcony space for light storage, in this case the balcony being in the front section of the building, above the office area. This storage space is reached by a ramp, plywood floored, not too steep for walking, but steep enough to utilize gravity in moving material.

Design also gives this building extreme visibility and from his office, Jack Burton points out that he can see what transpires in all other offices—that of Mrs. Burton, who functions as office manager, to his right; that of George E. Geuea, estimator, facing Mr. Burton's desk and that of John Lamb, Jr., cost accountant. In turn Mr. Lamb can observe the front entrance and the shop, all this being made possible by glass paneling.

Display of lighting

Jack Burton points out, too, that at least 15 different types of fluorescent lighting fixtures are used throughout the floor offices and lobby, for display purposes.

The structure is 60 feet wide by 120 feet long, with offices occupying 30 by 60 feet for 1,800 square feet and the shop 60 by 90 for 5,400 square feet. The west wing of the front is occupied by wash rooms, including shower for the men, a small shop for precision work and a coffee bar.

The rear section is finished in clay tile and the front is of concrete tile, finished in brick, with a planter box of Roman brick.

Revamping low voltage distribution in existing textile plants

by James R. Rutledge

President, Huntington & Guerry Electric Co., Greenville, S. C.

This article deals with the revamping of low voltage distribution in existing textile plants. It will be followed in future issues by a comprehensive discussion of factors affecting the cost of low voltage power distribution systems for new textile mill construction.

◆ PRODUCTION in our industry depends especially upon the electrical distribution system. Whether the plant is an old one or a new one, top production can continue only while this system performs in a dependable manner.

The addition of modern machinery, lighting, air conditioning and other equipment to existing plants usually requires some alterations to the electrical system. These changes may be minor or major depending upon the present facilities and the scope of the modernization program. For best results some planning is necessary.

Expansion planning

In planning the expansion of an existing system, definite information must be obtained on the present arrangement. This includes the size and characteristics of the substation, main disconnecting switches, service conductors, switchgear, feeders, distribution centers and branch circuits. Ampere readings should be obtained on the service conductors, main feeders and subfeeders. Voltage drops should be determined at principal points on the system. A tabulation of connected motor loads on each feeder and the physical location of these loads with respect to the source of power are important items.

This survey should be made thoroughly enough to get a clear picture of present operations. The information can then be reduced to a single line diagram showing all related facts.

The next step is far more difficult. The question is: How much load will be added? As simple as this may sound, it is hard to find the answer. Experience over the past years indicates that loads are increasing beyond most predictions. Many mills have doubled their loads, tripled them, or even gone further. This has a decided effect on the electrical system as a whole and every precaution must be taken to avoid future bottle necks.

During this phase of the survey, management can help greatly by visualizing as near as possible the future load additions to the plant. While this may be a difficult task, it is highly important to have these ideas in hand. The time spent may save money in the long run. It is better to be liberal than to be close in planning for additional loads.

Applying the best obtainable information on both the existing and the proposed systems, several elementary plans are constructed for serving the ultimate load. The existing system is conserved by incorporating it into the new system so far as it is practical to do so and obtain desirable operation. Each plan is weighed as to flexibility, safety, efficiency, economy, and other factors.

The program does not have to be completed at once, but may often be done in parts as conditions permit. By using this approach, a logical plan can be selected and the work scheduled to meet the requirements. Without a definite over-all plan, much time and money can be thrown away by temporary wiring, inadequate protection, and lost production. It pays to plan ahead.

Fault current studies

Low voltage systems (220-440 and 550 volts) sometimes grow in kva size until available fault currents exceed the interrupting capacity of the switchgear serving them. They may even grow beyond the maximum ratings of the accepted standard switchgear as manufactured today. These limits have been clearly defined by the industry. However, in computing fault currents the reactances of service conductors, long feeder circuits, and other elements of the system must be taken into account. These have a limiting effect on fault currents and in many cases will change the economic picture.

The power company should always be consulted about the available fault current at their substation and about proposed changes on their system which would affect the fault current. In the larger plants, the unit substation method of power distribution offers an ideal solution for keeping fault currents within reasonable limits. They afford good voltage regulation and the flexibility needed for future expansion.

Existing conduit feeders and sub-feeders can be used when available in the new system provided their physical condition is good and their location is suitable. Most insulations are impaired by over-heating. Moisture attacks varnished cambric. Oil works on rubber insulation. When existing conductors show signs of deterioration they should be carefully examined before reusing them. Megger tests alone are not always conclusive as to mechanical condition. A visual inspection in junction boxes and other points is needed.

This article is adapted from an address made before the 1955 Conference of the AIEE Textile Subcommittee, at N. C. State College, Raleigh.

Usually it does not pay to pull out old cables and reinstall them unless they are in excellent condition. Existing feeders should be used "in place" when possible.

New feeders represent a large investment of a permanent nature. They will be used much longer than the smaller wiring to machines. Therefore they should be selected and routed with this in mind. Junction boxes at frequent locations will afford easy installation and provide access for future tap-offs. These boxes should be ample in size so that conductors will not be cramped for space especially where taps are made.

Keep feeder isolated

The use of common junction boxes for several main feeders exposes all feeders in the box to trouble originating on any one feeder. If an arc starts, it can spread to other conductors causing severe damage and possibly interrupting production in more than one department. Each feeder circuit should be isolated throughout its length from switchboard to load. This construction is slightly higher in first cost, but the benefits of restricting trouble to one department will more than offset the additional cost.

When adding new feeders to existing plants several factors must be considered to determine the most economical cost. The conditions of exposure to heat, oil, moisture, and chemical action affect the selection of insulation. Type V and Type RH insulation are very satisfactory for most departments. Where chemical action is likely to take place such as in finishing plants, type TW, RR, and type RH are generally good.

Effects of chemical exposure should be checked with the chemist in charge of the plant for further analysis. Some wire manufacturers do not recommend Type TW for direct current circuits in moist locations. Types RR and RH are more suitable. Feeders should be permanently located when possible to avoid changing them during future plant rearrangement.

All hazardous areas and exposures to fire damage should be avoided. Fortunately, the comparative costs of standard types of insulation do not vary much, therefore, the proper choice can be made within reasonable cost limits to obtain satisfactory performance.

Relative cost data

The relative cost of main feeders, sub-feeders, and branch circuit wiring may be compared by using the unit cost per ampere per hundred feet of circuit. This method takes into account the original cost of installation, the current carrying capacity of the cable, and the cost of energy losses. These values will vary with material-labor costs, hours of operation, power rates, and loading of the circuit conductors. Therefore the unit values must be used with discretion, taking all factors into account. The accompanying tables were prepared for illustration.

Both tables are based on today's costs of labor and materials. The hours of operation are 7200 per year. Power rate is assumed to be one cent per kwh. The annual dollar value of energy losses has been capitalized at 25% to include depreciation, interest, and taxes. Table 1 is based on loading conductors to their full respective National Electric Code ampere ratings. Table 2 is based on loading conductors to 80 per cent of their full respective Code ratings. The installation cost per ampere per 100 feet of circuit is added to the capitalized energy loss to obtain the over-all cost. These values are all in dollars per ampere per 100 feet.

The installation costs include labor, materials, direct job expenses, overhead expenses, and contractor's profit. It is interesting to note the small variation in cost between adjacent sizes of conductors and throughout the entire range of sizes under each type of insulation. An increase in conduit size accounts for abrupt changes.

Conduit size remaining the same, in the case of 2-inch, it will be noted that cost increases with smaller cables as current capacity decreases. This confirms the general rule of filling the conduit with the largest conductors it will carry to give maximum use of materials.

Table 1—Relative costs, dollars per ampere per 100 feet

Based on 3 single conductors installed in rigid conduit with loads equal to 100% of National Electrical Code current ratings, and with energy losses capitalized on basis of 1 ¢/kwh, 7200 hrs/yr, cap. rate 25%.

Cond. size	Type V			Type RH			Type TW		
	Instl. cost	Cap. egy. losses	Total cost	Instl. cost	Cap. egy. losses	Total cost	Instl. cost	Cap. egy. losses	Total cost
12	2.97	4.23	7.20	3.85	2.83	6.68	3.75	2.83	6.58
10	2.82	3.55	6.37	3.33	2.77	6.10	3.23	2.77	6.00
8	2.64	2.80	5.44	2.60	2.51	5.11	2.80	2.25	5.05
6	2.54	2.47	5.01	2.42	2.29	4.71	2.78	1.94	4.72
4	2.52	2.00	4.52	2.40	1.88	4.28	2.89	1.54	4.43
2	2.10	1.67	3.77	1.98	1.60	3.58	2.33	1.36	3.69
1	2.19	1.54	3.73	2.12	1.44	3.56	2.43	1.22	3.65
0	2.37	1.37	3.74	2.21	1.31	3.52	2.56	1.10	3.66
00	2.14	1.28	3.42	2.05	1.21	3.26	2.40	1.01	3.41
000	2.08	1.16	3.24	1.98	1.10	3.08	2.31	.91	3.22
0000	2.32	1.10	3.42	2.26	1.06	3.32	2.52	.90	3.42
300,000	2.25	1.00	3.25	2.24	.94	3.18	2.47	.79	3.26
500,000	2.36	.85	3.21	2.37	.80	3.17	2.63	.68	3.31
750,000	2.64	.75	3.36	2.71	.71	3.42	2.99	.59	3.58

Table 2—Relative costs, dollars per ampere per 100 feet

Based on 3 single conductors installed in rigid conduit with loads equal to 80% of National Electrical Code current ratings, and with energy losses capitalized on basis of 1 ¢/kwh, 7200 hrs/yr, cap. rate 25%.

Cond. size	Type V			Type RH			Type TW		
	Instl. cost	Cap. egy. losses	Total cost	Instl. cost	Cap. egy. losses	Total cost	Instl. cost	Cap. egy. losses	Total cost
12	3.71	3.38	7.09	4.81	2.26	7.07	4.69	2.26	6.95
10	3.52	2.84	6.36	4.16	2.22	6.38	4.04	2.22	6.26
8	3.30	2.24	5.54	3.25	2.01	5.26	3.50	1.80	5.30
6	3.18	1.98	5.16	3.03	1.83	4.86	3.48	1.55	5.03
4	3.15	1.60	4.75	3.00	1.50	4.50	3.61	1.23	4.84
2	2.63	1.34	3.97	2.48	1.28	3.76	2.91	1.09	4.00
1	2.74	1.23	3.97	2.65	1.15	3.80	3.04	.98	4.02
0	2.96	1.10	4.06	2.76	1.05	3.81	3.20	.88	4.08
00	2.68	1.02	3.70	2.56	.97	3.53	3.00	.81	3.81
000	2.60	.93	3.53	2.48	.88	3.36	2.89	.73	3.62
0000	2.90	.86	3.76	2.83	.85	3.68	3.15	.72	3.87
300,000	2.81	.79	3.60	2.80	.74	3.54	3.09	.63	3.72
500,000	2.95	.68	3.63	2.96	.64	3.60	3.29	.54	3.83
750,000	3.30	.61	3.91	3.39	.57	3.96	3.74	.47	4.21

Installation costs are higher per ampere for the smaller conductors and for the 750,000 CM size. The higher costs for type TW insulation in medium and larger sizes are due to the lower ampere ratings of these conductors.

How losses vary

The energy losses per ampere increase consistently as smaller conductors are used indicating the rapid decrease in area of copper per ampere of load. With smaller conductors carrying their rated load the percentage of loss is greater than in the larger conductors. When losses are capitalized and added to installation costs the greater efficiency of medium and large conductors is apparent.

Table 2 indicates costs when cables are loaded to 80 per cent of the Code rating. The Code requires margins of 25 per cent of actual current in some cases. These values indicate an increase in installation cost per ampere and a decrease in losses per ampere per 100 feet of circuit affected by the reduced current. The installation costs are relatively higher due to the reduction in amperes transmitted. This increase in cost is partially offset by the reduction in energy losses. The total cost is about 7 to 12 per cent higher at the reduced rating.

These relative costs indicate that where a specific kind of insulation is not required because of special conditions, the lowest costs for small conductors #12 - 10 - 8 occur in the TW group. The medium sizes 6 - 4 - 2 - 1 - 0 - 00 - 000 are cheaper in type RH. The larger sizes 0000 - 300,000 - 500,000 - 750,000 can be either RH or V leaning slightly toward RH by a small margin.

Often personal preference or availability of material can be the deciding factor of selection. However, conditions of exposure should always be a strong governing factor in the selection of conductor insulation. Surrounding temperatures of the room must be taken into consideration, as required by the Code, and current carrying capacities of conductors adjusted accordingly. This applies to temperatures above 86 degrees F.

Some plants are still using fuses on the ceiling for protection of branch circuits and sub-feeders. These are hazardous to personnel and very inconvenient to service. It is strongly recommended that these be replaced by safety switches or air circuit breakers mounted in accessible locations. These may be installed in groups on permanent walls. Ventilation should be afforded on all sides of these devices to keep temperatures within range. Provision should be made to prevent condensation on walls from wetting or entering these enclosures. This can be accomplished by spacing them out an inch or two from the wall.

Safety switches with fuses are inherently heat generators unless their loads are well below their ratings. The continuous load should not exceed 75 per cent of the rating for satisfactory service. This applies also to fused type distribution panels. The mains should always be liberal in size. Loads on branches are limited to about 65 per cent of rating.

Air circuit breakers are becoming more popular in many plants. They afford accurate overcurrent protection, safety of enclosed parts, and protection from single phasing when they open the circuit. The first cost is about 50 per cent higher.

Machine connections

Flexible conduit for motor terminal connections on looms, spinning frames, twisters, and other machines is being replaced with four conductor Neoprene sheath cable or Type SO cord. This does away with the sharp edges on flexible conduit which are potential sources of damage to insulation. The ground connection to motor frame is made with the fourth wire. The other end of this wire is connected to a ground wire in the starter. This ground extends back to the panel, distribution center, or to the larger conduit of the branch feeder. This method is superior to the exposed strap or ground wire formerly used for equipment grounding to conduit. There is less danger of physical damage where

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Distributors fare better in 1955, see more improvement in 1956

◆ THE COURAGE to turn down an unprofitable order is evident in the year end results of the electrical wholesale distributing industry.

Both sales and profits were up in 1955. Sales of electrical construction materials and appliances totalled about 12 per cent more in 1955 than in 1954. Of more interest was the report that the five year decline in the net profit trend has been halted and shows signs of improving. Actually, the net profit results were up slightly in 1955 for the first time since 1950. However, the net profits in the wholesale trades field are still much lower than they should be on a standard commercial risk investment.

The 1955 record stands as a tribute to the intelligence and business acumen of the management of hundreds of electrical distributing companies.

Widespread misconceptions

And this improved performance record has been achieved despite continued widespread misconceptions regarding the function of the distributor and in spite of the failure to utilize him properly so that he can add value to the manufactured product.

Our economy—and the great standard of living it provides—has been built on providing the most goods to the most people at the lowest cost. Yet, some of the present trends in distribution are working opposite to that fundamental economic principle.

Today, the American public is being served with a 1920 distribution machine hooked up to a 1955 factory.

As a result, it is entirely within the realm of probability that the American public may suffer from a "starvation in the midst of plenty" unless the vital problem of balancing distribution and production is solved immediately.

These are some of the problems that are most urgent today:

by Arthur W. Hooper

Executive Director
National Assn. of Electrical Distributors, New York City

(1) Soundly established, successful distributing businesses are being squeezed while uneconomic and short lived distribution experiments are being tried out. Thus, less and less risk capital is being attracted to the wholesale distribution field because of the unstable and unsatisfactory returns on investments in this type of commercial organization.

(2) It has long been acknowledged in business that, when the cost of service and production of any merchandise rises, the price of the goods also goes up. This is a practical step for any business. No business can remain active for long selling goods for less than what they pay for them. *Yet, mounting costs in time and manpower for wholesale distribution are not being recognized.*

During the past year the wholesale business has, on a number of occasions, encountered this problem. While the cost of the production of goods has gone up at the manufacturing level, the solution to the additional cost has been found in simply lowering the discount at which the goods are sold to the distributor. In other words, the price to the distributor has gone up.

Distributors squeezed

It is a fundamental fact that the distributor occupies a unique position in the wholesale distribution of any goods. He is not the ultimate buyer who can set a price for the goods and then sell them to the customer direct. Rather, he is a convenience or service organization that performs certain vital functions at a savings to the manufacturer and deals in prices that are set by the manufacturer in most instances—and not by himself.

Thus it is obvious that the distributor can easily be squeezed by an unintelligent decision on the part of the management of manufacturing companies. Intelligence demands that if the production of a piece of equipment rises then the list price of that equipment must also go up in order to compensate the manufacturer for producing it—that and allow the distributor a reasonable profit for handling, warehousing, selling and carrying out all of the additional functions that he performs in distributing that product.

(3) The tremendous advancement in manufacturing techniques has not been equalled by the development of better techniques and systems for the wholesaling and retailing of goods.

America must recognize that the development of the low cost, mass production factory is only half the battle. It will not provide the ultimate in lowering the cost of these goods. The real battle must include carrying the goods from the factory shipping platforms to every market in America.

Simple economics involved

(4) This nation is passing from an era of production into an era of distribution. The great problems ahead for the economy are not those of producing sufficient goods but, rather, effectively distributing these products so that they are in the right place at the right time in the right quantity.

The test of whether or not the distributor contributes to the value of these goods by distributing them more economically is a simple decision for the manufacturer. It is a matter of dollars and cents. If the distributor can do it more economically than the manufacturer can himself, then he deserves to

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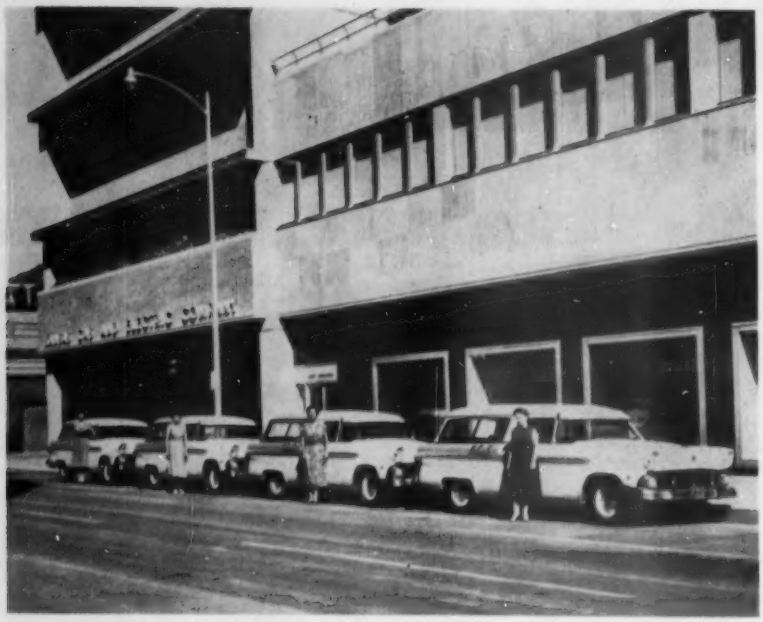
Test program shows home lighting sales can be boosted



Home lighting specialists in both towns carry their demonstration equipment in brightly painted station wagons. These pink and cream cars in Wichita are not only utilitarian, but they help to attract attention and arouse interest in the lighting program.

◆ IMPROVED residential lighting can be sold in volume and at justifiable expense. This has been shown by two utility test programs which have just completed their first year of operation. Utility leadership and coordination have been vital to the success of the activity, welding the widely-diversified field of equipment merchandisers and suppliers into a cohesive sales force.

Kansas Gas and Electric Company and Mississippi Power and Light Company first began test operations of a full scale "Light for Living" program in the late fall of 1954. These controlled promotions covered the metropolitan areas of Wichita, Kansas, and Jackson, Miss., thus allowing close supervision during the inauguration of the program. Managements of both companies intend to intensify and expand activities in 1956.

"Light for Living" is a broad program on a continuing basis, covering all phases of the market and providing leadership, coordination, training and market stimulation. The plan was developed, and the initial year's activity coordinated, by Ebasco Services, Inc., for the Lamp Division of General Electric Co.

Four principles

The program has developed four new concepts; new, only so far as most utility lighting promotion today is concerned, but actually combining many tried and proved promotion methods.

(1) Continuing promotion has been found to be one keynote to successful lighting market stimulation. For years, utilities have engaged in a continuing promotion of appliances. The "Light for Living" program is a comprehensive, long-term activity paralleling appliance promotion, but aimed specifically at the so-different customer buying desires which influence lighting sales.

(2) Full-time supervision of lighting sales was established by the appointment in both areas of a residential lighting supervisor. Under his direction mass sales promotion and personal customer contacts are carried out. The latter serve to offer "leadership by example" to lighting equipment suppliers and installers, demonstrating that fixture promotion and creative selling can be profitable.

(3) All-inclusive promotion in the new and existing home fields, and covering all types of portables, fixtures and structural lighting is necessary, according to the test, for a successful operation. Promotions aimed at only a segment of the total market had been tried before, with mediocre success.

(4) Light conditioned "example" homes are the major objective of the direct-call lighting specialists. It was found that a complete and outstanding relighting job in a neighborhood or area becomes a conversation piece, pro-

Utility lighting specialists carry a big array of lamps, literature and tools with which to demonstrate to the homemaker and dealers how easy it is to modernize lighting in the average home.

Women are particularly susceptible to the glamour and beauty approach in home lighting. Recommendation made for this entry hall led to light conditioning of entire home and led to other sales nearby.

voking desire and creating dissatisfaction with present inadequate lighting on the part of other homemakers. The sale of small lighting additions to every home fails to arouse interest, and generates no enthusiasm for a major modernization.

Action is objective

The basic objective of the program is to sell complete light conditioning, not only in the new home market, but in the vast mass market of existing homes. Building an aggressive and effective team of dealers and suppliers who will undertake creative selling on their own requires that the profit possibilities of residential lighting be amply demonstrated. Utility direct-call activity is slanted toward producing this proof of profits; once sales allies see for themselves that there is money to be made in residential lighting they become anxious to increase their sales and promotion efforts.

The greatest potential market is the existing home, and this market is being opened up. Fixture suppliers are being influenced by utility leadership in down-to-earth, customer-contact promotion to hire full-time salespeople themselves. Considerable improvement is seen in display and sales efforts, and several fixture outlets have or are now planning locations better situated for retail trade.

Though it takes time to get such a program into motion, and results the first year are apt to be slow, the experience in the two test cities has been more satisfying than was expected.

One Wichita store which sells major appliances, residential fixtures, and does wiring contracting recently moved to a new and larger location in a suburban shopping center. The fixture display, which used to be in the rear, now occupies a feature position in the front. Lamp modernization and rebuilding, spurred by the utility promotion, now keeps one man busy full time. Keepsakes and lamps of sentimental value are rebuilt with three-way sockets, diffusing bowls, new shades and cords in enough volume, according to owner, to pay the rent on the store.

Results are satisfactory

Distributors report lighting fixture sales increases of at least 15 per cent and some as high as 49 per cent. In addition, fixture suppliers are finding that fixture sales have improved in size, quality and price per fixture. Portable lamp dealers report volume increases of from 15 per cent to 70 per cent, together with a growing customer awareness of lighting quality. Builders of over 65 per cent of new homes were sold on increasing the number of fixtures per house, as well as improving quality.

The two utilities went into the program with the understanding

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How one utility is selling

The Brent dining room is lighted by tubes in the valance, and a center fixture above the table which raises or lowers at a touch.

◆ FOR SELLING electrical living, in all of its phases, to potential home owners and builders, the Mississippi Power and Light Co., Jackson, Miss. employs a staff of over 120 managers, supervisors, salesmen, home economists, and lighting experts in the company's divisions serving a large part of the state.

Working together as a team, which also includes electrical appliance dealers, distributors, and wiring contractors, the company personnel employ a selling method which has substantially increased the consumption of their product.

Case history

To illustrate how this method works, let us consider a recent case history, which shows the initial contact with the potential electrical power user; and how the en-

Bubble-type fixture is used for all-over light in Brent family room. Swivel type ceiling fixture lights driftwood decoration on fireplace.

Entrance wires and service meter for the 3-phase service of four No. 2 entrance wires. Distribution panel contains 28 circuit breakers.

electrical living

by Ed London

tire selling operation resulted in the completion of a more than adequately wired home.

It all started when J. M. Brent, a Crystal Springs, Miss., building contractor, working through the Mississippi Lumber & Supply Co., of Crystal Springs, made application to the power company for temporary electrical service needed for the operation of power tools in the construction of a new home for himself and family.

This initial application for power by Mr. Brent was the tip-off that sent Joe Seay, dealer representative for MP&L into action. As the salesman assigned to that area, Mr. Seay approached Mr. Brent about the advantages of installing an adequate wiring job in the new home. At the same time he urged Mr. Brent to install a completely electric kitchen.

Said Joe Seay, "I was successful in getting the adequate wiring idea across to Mr. Brent. However, he referred me to Mrs. Brent in regard to the all-electric kitchen, and the lighting for the home.

Selling the kitchen

"Mrs. Brent liked the idea of an all-electric kitchen and a light-conditioned home, so I obtained a set of the house plans and carried them to our Jackson office, where I drew in the adequate wiring details.

"While I was doing this," said Mr. Seay, "Mrs. Irene Covington, representative of MP&L's home lighting specialists, prepared the lighting plans with the help of General Electric's Nela Park Institute of Lighting."

During the original conversation with Mr. Brent, Joe Seay had brought up the idea of the installation of an all-weather heat pump unit to furnish both heat and air conditioning for the new home.

"At first", he says, "the Brent's were skeptical about the heat pump idea. But after several conferences, in which I presented heat pump data obtained from Motors, Inc., of Jackson, Mr. Brent asked me to present cost data on the operation of the heat pump. A long-distance call to our Yazoo City office furnished the desired information, which was so satisfactory that within 45 minutes Mr. Brent placed an order with Motors, Inc., for the installation of an all-electric heat pump for the new home."

Lighting specialist

In the meantime, Mrs. Covington had several conferences with Mrs. Brent in regard to the type and the placing of lighting fixtures for the new home.

"In drawing up a lighting design for the Brent house," she says, "I kept in mind the family and their needs; making a special effort to carry out their wishes, with emphasis on structural lighting for indirect over-all illumination and soft beauty; special treatment was given each seeing task.

"In my preliminary discussions with Mrs. Brent, I explained that the over all idea of light conditioning is a room full of light—no dark corners—and no shadows. To obtain this, I simply applied tested lighting recipes from the Nela Park laboratories."

With the construction of their new home well underway, Mr. and Mrs. Brent visited Coopers Appliance Store, in Hazelhurst only a few miles away, and purchased a built-in electric oven. Electrci dishwasher, and disposal unit. A table top electric grille was furnished by the Stuart C. Irby Co. of Jackson. For the laundry just outside the kitchen, the Brent's purchased a combination washer and dryer, and also an ironer. This room also contains an electric water heater.

Now completed, the 3,000 square foot home is attracting considerable attention from other potential home buyers and builders. It has a 3-phase service of four No. 2 entrance wires. The distribution panel contains 28 circuit breakers, 24 of which are in service with four as spares, and a 100-ampere master switch.

Pleased as punch with her all electric home, Mrs. Brent had

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It was easy for the home economist to convince Mrs. Brent that the all-electric kitchen would lighten her culinary chores, and as a result she now has room full of work saving, electrical appliances.

Large area light diffusers suited to classroom use

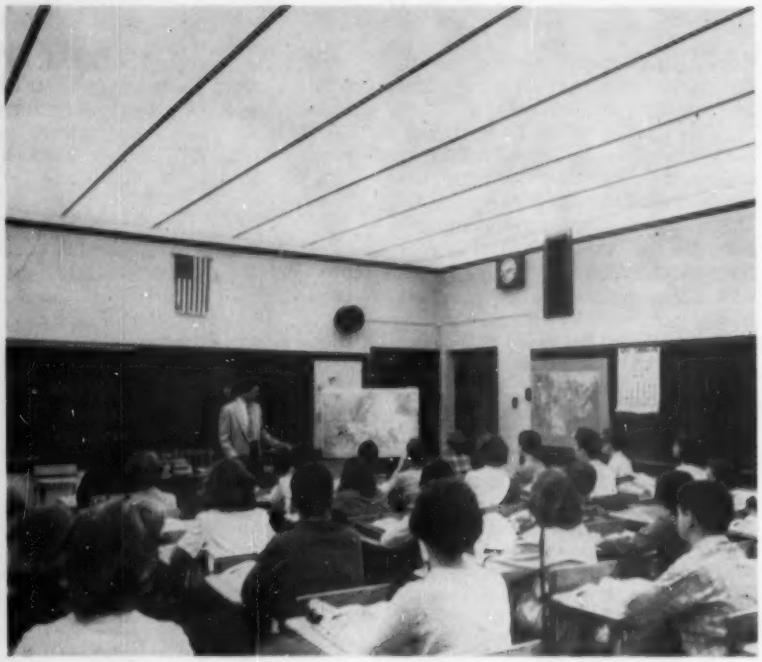
◆ FEW WOULD QUESTION that the luminous ceiling, developed during the last decade to provide fully diffused light, and other services if desired such as noise control, sprinklers, air distribution, etc., is one of the most important contributions to building interiors since Edison invented the electric lamp. From the very first, school people have recognized its desirability for classrooms, but in its wall-to-wall form the cost of the suspended electrical ceiling has been beyond their reach.

Now a variation on the full ceiling of light is available at much lower costs to schools, because there is no need to design to the irregularities of a typical classroom. Many of them have pipes from floor to ceiling, columns in one or more corners, and other departures from the rectangular.

Installation simplified

In one line of plastic, large area light diffusers, which comes in standard sizes for typical classrooms, the electrical ceiling does not touch the walls. In a school room, on sides where the fluorescent lamps run parallel to the

(Continued on page 32)



This classroom is illuminated with Wakefield's large area lighting diffusers designated as "Photo-Metrics." The diffusers are made of a noncombustible vinyl called Wakon. This installation provides uniform light with a minimum of glare or shadows.

Comparison of total installed cost of luminous ceiling with conventional continuous row type installations for a standard classroom, 24 ft. by 32 ft.

	Type 1	Type 2		Type 3		Type 4
	3 rows-7 units-	3 rows-7 units-	2 rows-7 units-	3 rows-7 units-	2 rows-7 units-	Luminous ceiling
Total lighting equipment cost	$605.87	$507.65	$338.76	$382.39	$255.26	$560.09
Installation cost, subject to local variations	$ 87.00	$ 77.00	$ 51.00	$ 77.00	$ 51.00	$108.00
Total installed cost	$692.87	$584.65	$389.76	$459.39	$306.26	$668.09
Cost of finishing structural ceiling with fibre tile	$307.00	$307.00	$307.00	$307.00	$307.00	$ 35.00
Total installed lighting and ceiling cost	$999.87	$891.65	$696.76	$766.39	$613.26	$703.09
Cost of electrical power per year at 2½ cents per kwh	$ 60.00	$ 60.00	$ 40.00	$ 60.00	$ 40.00	$ 50.40

The above is based upon use of rapid start lamps in all units—lamp costs estimated at 30% off list—labor at $4.80 per hour. Cost of luminous ceiling, Type 4, (see photo) in this comparison is based on use of Wakefield Photo-Metrics, large area lighting diffusers; the cost of finishing for Type 4 includes paint only.

Case histories in labor relations

How would you have handled these labor grievances?

This roundup of day-to-day problems in labor relations provides an opportunity to test your judgment as to what is right and wrong. Each incident is an actual grievance that went to arbitration. Names have been changed for obvious reasons, but readers may obtain actual citations on any specific case by writing to the editor.

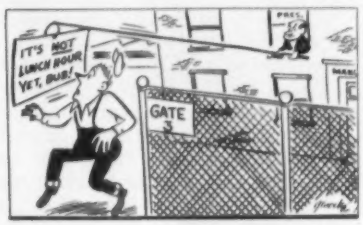
Quitting early

Can you fire an employee for leaving his job before the regular quitting time?

What happened

About 11:30 in the morning, the company president was walking towards the plant entrance when he spied Ewell Fergeson, (an employee he knew) walking towards his car. The president called to Ewell and told him to report to his foreman for being off the job prior to the lunch whistle. Ewell said he would and went to lunch anyway. He returned at 12:45, punched his timeclock and reported to his supervisor.

When the foreman checked Ewell's timecard, he discovered



that someone had apparently punched out for the employee at lunch because the card showed a 12:00 noon exit, in spite of the fact that he was seen outside the plant at 11:30. Ewell maintained ignorance as to who punched his time card. He was given an indefinite layoff until he told who did the punching out for him. A few days later when he still refused to proffer the information, he was fired.

Ewell took his case to arbitration. He charged the company was wrong on several counts:

(1) Management can't discipline an employee by giving him an "indefinite layoff." Punishment must be specific and definite, he maintained.

(2) Firing was not justified because his offense was not *that* serious. Sure he left early one day without permission, but that's not a capital offense, he said.

Was Ewell: Right ☐ Wrong ☐

What arbitrator ruled: "The original penalty of an indefinite layoff plainly lacked proper cause in this case because it had no specific duration. If the company felt that Fergeson's failure to explain the entry on his time card was an offense which warranted the imposition of discipline, it had the duty of weighing the degree of the offense and then imposing a sanction consonant with the offense. A layoff "until an explanation is given" is a wholly unreasonable and insupportable penalty under this contract.

The only offense of which Fergeson may fairly be said to be guilty is his brief anticipation of the noon whistle.

Discipline in some degree is warranted for this offense, and the arbitrator does not condone his action. But the penalty of discharge for such an offense, particularly when there is no prior record of discipline against Fergeson, is a gross violation of "proper cause."

The maximum penalty which the company could conceivably have imposed, allowing the fullest latitude for the exercise of managerial discretion, is a layoff of one week and the award, therefore, so provides."

"Slowdown" leaders

When can't you fire an employee for leading a "slowdown"?

What happened

Before Petchell and Peterson were discharged, Foreman Edwin Flickinger sent the following note to the general manager, Pete Gurilis: "These two employees are known both by the company and the union as being bad actors, very poor employees with no sense of honor, duty or responsibility towards their employer. They respect no authority and no one. Constantly they have been the party behind the curtailment of work in my department. Their purpose has been to restrict production and influence others to do the same."

The general manager who for two years had been disturbed at the low productivity of the employees in that department gave the signal to fire the two men as ringleaders in a deliberate slowdown.

Petchell and Peterson objected to the company's action and reasons for it. They admitted that production in the department had been going from bad to worse, but

blamed it on poor management and bad blood between foremen and employees. Their big beef however was that the foreman singled them out for discipline when in effect all the employees were soldiering on the job.

The company had allowed this condition to go on for two years, they said, and no one had been

taken to task before. So, they maintained, why should they take the rap.

The company had witnesses who testified: "When Petchell and Peterson were out, the whole department was improved." And "while others were guilty of slowdowns, Petchell and Peterson were the worst of the whole lot."

Were the fired employees' arguments: Right ☐ Wrong ☐

What arbitrator ruled: "It is well recognized in the field of labor relations generally that discipline must be imposed fairly.

"Were it not for the fact that the testimony showed continuous toleration of misconduct over a long period of time, by employees other than Petchell and Peterson, and the failure of the Company to discipline these other employees, the arbitrator would uphold the discharges. This latter factor is the discrimination which, in the arbitrator's opinion requires a reduction of the penalty.

"The arbitrator concludes that the discharge of Petchell and Peterson for their part in creating the deterioration of discipline and production and in the curtailment of work and restriction of production is too severe a penalty because: (1) It is apparent that management was at fault, in part, in allowing this situation to develop and to continue for an extended period of time. (2) Other employees who were also guilty received no penalty.

"Had the grievants been discharged and other employees penalized by a disciplinary layoff, there would be justification for affirming the discharge. However, other guilty employees were not disciplined for their misconduct, but Petchell and Peterson were alone singled out for discipline.

"However, their offense was a serious one, hence the penalty should be severe. The arbitrator rules that the discharges of Darwin Petchell and Lawrence Peterson shall be rescinded and that the penalties invoked against each of them shall be reduced to three months' disciplinary layoffs."

Garnisheed pay

What is a reasonable policy for management to adopt for employees whose pay is garnisheed?

What happened

The management had a real problem on its hands. In a single year, 45 employees had their pay attached by creditors. To cut down on expense and nuisance of handling these claims, the company decided to post a new rule: Any employee who had three garnishees would be fired.

In conjunction with this, the management set up a program of warnings. Each employee who got his pay attached was specifically reminded of the new rule. When the new rule was posted, Frank Darden already had two garnishments against him. He was told to be careful about his future debts because the company would not countenance another attachment.

A few weeks later, the payroll department received a collection notice from one of Darden's creditors. He was fired. He complained:

(1) The new rule should not be made retroactive and that this in effect is his "first" offense.

(2) The rule is unreasonably harsh and the cause of serious hardship for employees.

The company said that garnishment was never a condonable offense and even one garnishment is enough to justify severe disciplinary action. Besides, the employee was specifically warned to stay out of debts he couldn't meet.

Was the company: Right ☐ Wrong ☐

What arbitrator ruled: "It is my opinion that this three garnishment-out rule is a reasonable rule justified by the facts. Because of the careful and repeated warnings given to employees before they are subjected to discharge for this reason, I can see nothing unreasonable on the part of the company, or anything inconsistent in this rule.

"The application of the rule to Darden was definitely neither hasty, harsh, nor discriminatory. He in particular cannot complain of lack of full notice and warning that the rule would be invoked against him if he permitted the debt in question to go to the point of garnishment. The award, therefore, is that this grievance be denied."

Light diffusers

(Continued from page 30)

wall, the lighting canopy can be 30 inches from the walls, and more than that in a rectangular room. The lamps, mounted on the structural ceiling, are at the center line of the plastic diffusers which are three feet wide. The distance of the electrical ceiling from the ends of the room can be as much as 20 inches.

In other words, the ceiling can practically fill the room dimensions if there are no obstructions, or it has leeway up to the distances mentioned.

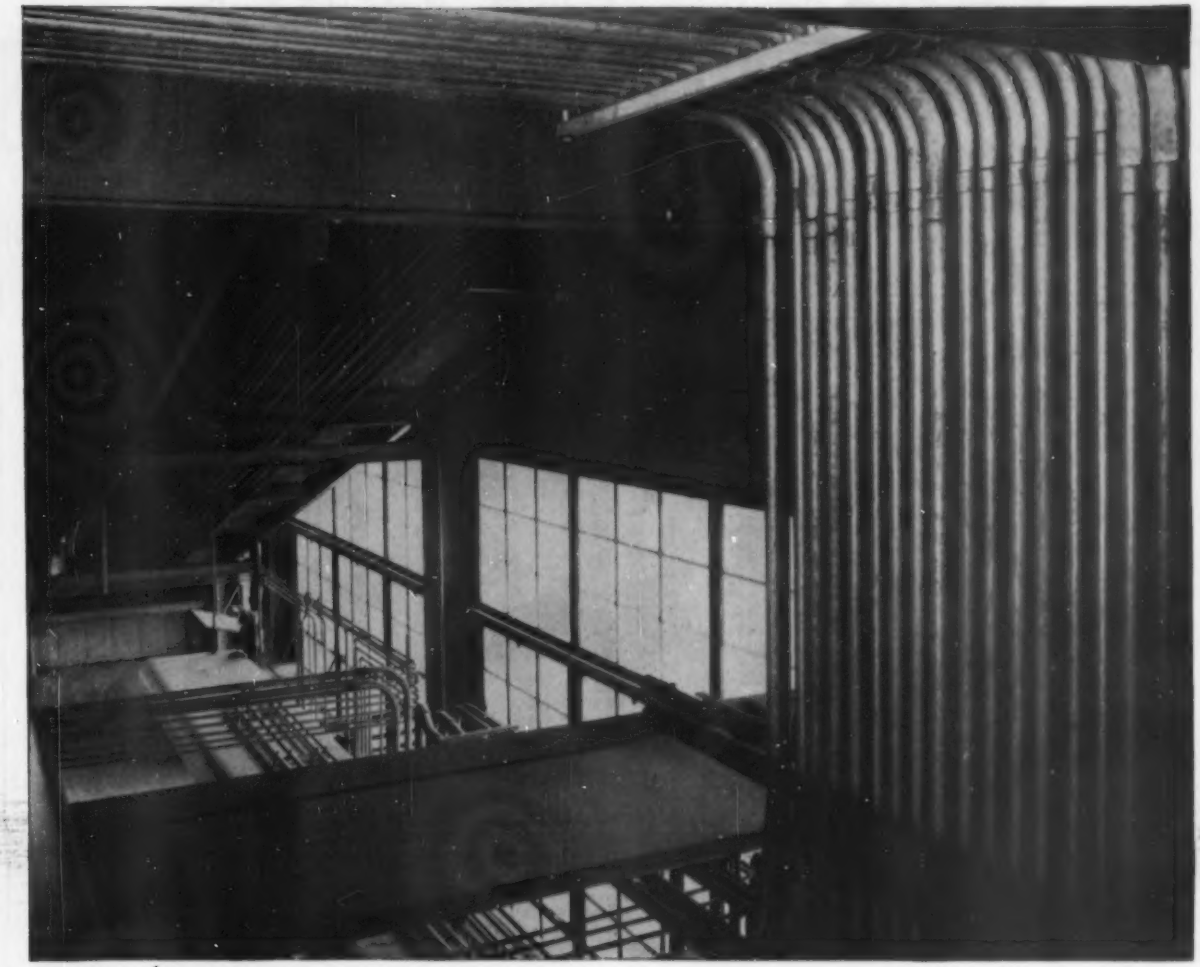
These large area diffusers are made of a non-combustible special vinyl formulation called Wakon. They are mounted on a suspended grid of extruded aluminum or vinyl, rigidly locked so that there is no need for wall attachment. The grid and diffusers come in stock sizes based upon typical lengths and widths of classrooms which are generally quite standard in dimensions.

Cost comparison

The manufacturer has made a study of costs of installing this luminous ceiling type equipment as compared with conventional continuous row types of fixtures which have been used in schools for years. The tabulated costs shown here are based upon three types of continuous row installations in maximal and minimal applications, plus the cost of finishing a ceiling with fibre tile in each case. Cost of the fourth type is based upon basic cost of large area lighting diffusers, plus painting the structural ceiling, which need not be finished beyond painting since it will be shielded by the broad-area diffusers.

Building and electrical trades' rates vary in various sections, as do local power costs. But in the above case the cost of the large area diffusers and painting as compared with the highest priced continuous row equipment plus finishing the structural ceiling favors the diffusers by $296.78 a room. The ceiling type lighting is only $89.83 over the minimal use (14 units) of the *lowest priced* equipment recommended by the manufacturer for schools.

There is a variation of 13 footcandles, maximum, between large area diffuser installation and the other three. As to lighting quality, No. 4 is comparable with No. 1 which is luminous-indirect, and footcandles are equal.



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3 WIRE - 1 PHASE

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		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
4	3.2	4.00	4.80	5.60	6.40	7.20	8.00	8.80	9.60	10.40	11.20	12.00
6	4.5	5.63	6.75	7.88	9.00	10.13	11.25	12.38	13.50	14.63	15.75	16.88
8	5.8	7.25	8.70	10.15	11.60	13.05	14.50	15.95	17.40	18.85	20.30	21.75
10	7.0	8.75	10.50	12.25	14.00	15.75	17.50	19.25	21.00	22.75	24.50	26.25
12	8.6	10.75	12.90	15.05	17.20	19.35	21.50	23.65	25.80	27.95	30.10	32.25
14	9.8	12.25	14.70	17.15	19.60	22.05	24.50	26.95	29.40	31.85	34.30	36.75
16	11.2	14.00	16.80	19.60	22.40	25.20	28.00	30.80	33.60	36.40	39.20	42.00
18	12.6	15.75	18.90	22.05	25.20	28.35	31.50	34.65	37.80	40.95	44.10	47.25
20	14.0	17.50	21.00	24.50	28.00	31.50	35.00	38.50	42.00	45.50	49.00	52.50
22	15.4	19.25	23.10	26.95	30.80	34.65	38.50	42.35	46.20	50.05	53.90	57.75
24	16.8	21.00	25.20	29.40	33.60	37.80	42.00	46.20	50.40	54.60	58.80	63.00
26	18.2	22.75	27.30	31.85	36.40	40.95	45.50	50.05	54.60	59.15	63.70	68.25
28	19.6	24.50	29.40	34.30	39.20	44.10	49.00	53.90	58.80	63.70	68.60	73.50
30	21.0	26.25	31.50	36.75	42.00	47.25	52.50	57.75	63.00	68.25	73.50	78.75
32	22.4	28.00	33.60	39.20	44.80	50.40	56.00	61.60	67.20	72.80	78.40	84.00
34	23.8	29.75	35.70	41.65	47.60	53.55	59.50	65.45	71.40	77.35	83.30	89.25
36	25.2	31.50	37.80	44.10	50.40	56.70	63.00	69.30	75.60	81.90	88.20	94.50
38	26.6	33.25	39.90	46.55	53.20	59.85	66.50	73.15	79.80	86.45	93.10	99.75
40	28.0	35.00	42.00	49.00	56.00	63.00	70.00	77.00	84.00	91.00	98.00	105.00

LABOR: INCLUDES MOUNTING PANEL AND CONNECTING BRANCH CIRCUITS AND FEEDERS.

2-56

NEW WORK

PANEL'S MULTIBREAKER DISTRIBUTION
4 WIRE - 3 PHASE SURFACE MOUNTED

PANEL SIZE	HRS. EA.	LABOR COST INSTALLED EACH AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
6	4.7	5.88	7.05	8.23	9.40	10.58	11.75	12.93	14.10	15.28	16.45	17.63
8	6.1	7.63	9.15	10.68	12.20	13.73	15.25	16.78	18.30	19.83	21.35	22.88
10	7.3	9.13	10.95	12.78	14.60	16.43	18.25	20.08	21.90	23.73	25.55	27.38
12	9.1	11.38	13.65	15.93	18.20	20.48	22.75	25.03	27.30	29.58	31.85	34.13
14	10.4	13.00	15.60	18.20	20.80	23.40	26.00	28.60	31.20	33.80	36.40	39.00
16	11.9	14.88	17.85	20.83	23.80	26.78	29.75	32.73	35.70	38.68	41.65	44.63
18	13.4	16.75	20.10	23.45	26.80	30.15	33.50	36.85	40.20	43.55	46.90	50.25
20	14.6	18.25	21.90	25.55	29.20	32.85	36.50	40.15	43.80	47.45	51.10	54.75
22	16.5	20.63	24.75	28.88	33.00	37.13	41.25	45.38	49.50	53.63	57.75	61.88
24	18.0	22.50	27.00	31.50	36.00	40.50	45.00	49.50	54.00	58.50	63.00	67.50
26	19.6	24.50	29.40	34.30	39.20	44.10	49.00	53.90	58.80	63.70	68.60	73.50
28	21.3	26.63	31.95	37.28	42.60	47.93	53.25	58.58	63.90	69.23	74.55	79.88
30	22.8	28.50	34.20	39.90	45.60	51.30	57.00	62.70	68.40	74.10	79.80	85.50
32	24.5	30.63	36.75	42.88	49.00	55.13	61.25	67.38	73.50	79.63	85.75	91.88
34	25.9	32.38	38.85	45.33	51.80	58.28	64.75	71.23	77.70	84.18	90.65	97.13
36	27.7	34.63	41.55	48.48	55.40	62.33	69.25	76.18	83.10	90.03	96.95	103.88
38	29.3	36.63	43.95	51.28	58.60	65.93	73.25	80.58	87.90	95.23	102.55	109.88
40	31.0	38.75	46.50	54.25	62.00	69.75	77.50	85.25	93.00	100.75	108.50	116.25
42	32.9	41.13	49.35	57.58	65.80	74.03	82.25	90.48	98.70	106.93	115.15	123.38

LABOR: INCLUDES MOUNTING PANEL, AND CONNECTING BRANCH CIRCUITS AND FEEDERS.

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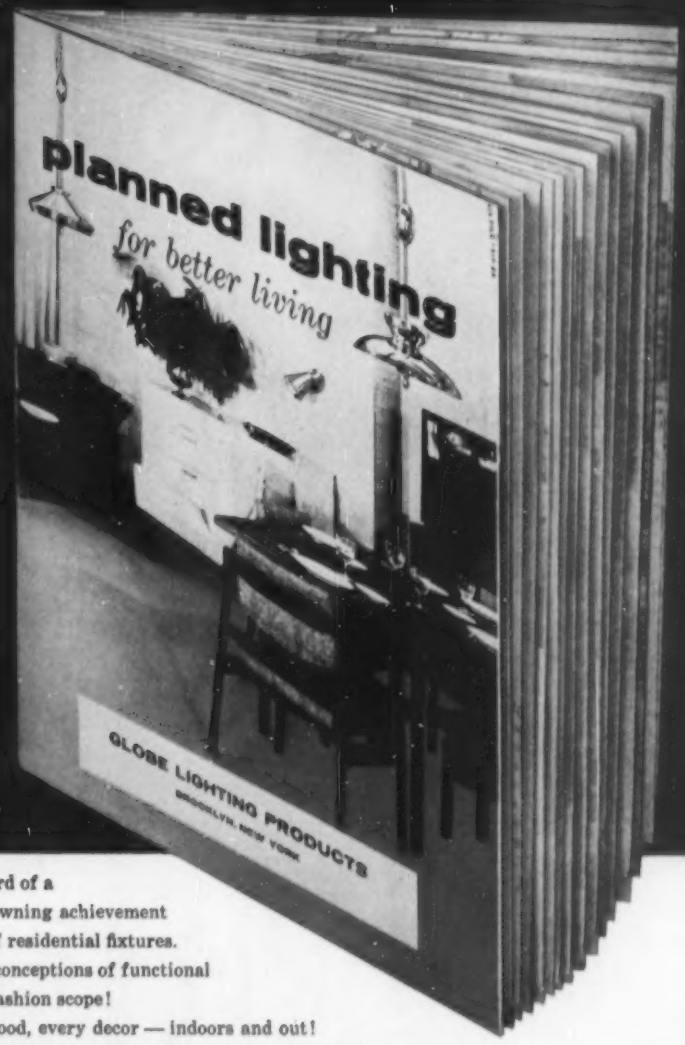

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		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
4	3.6	4.50	5.40	6.30	7.20	8.10	9.00	9.90	10.80	11.70	12.60	13.50
6	5.1	6.38	7.65	8.93	10.20	11.48	12.75	14.03	15.30	16.58	17.85	19.13
8	6.6	8.25	9.90	11.55	13.20	14.85	16.50	18.15	19.80	21.45	23.10	24.75
10	8.0	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00	26.00	28.00	30.00
12	9.8	12.25	14.70	17.15	19.60	22.05	24.50	26.95	29.40	31.85	34.30	36.75
14	11.2	14.00	16.80	19.60	22.40	25.20	28.00	30.80	33.60	36.40	39.20	42.00
16	12.8	16.00	19.20	22.40	25.60	28.80	32.00	35.20	38.40	41.60	44.80	48.00
18	14.4	18.00	21.60	25.20	28.80	32.40	36.00	39.60	43.20	46.80	50.40	54.00
20	16.0	20.00	24.00	28.00	32.00	36.00	40.00	44.00	48.00	52.00	56.00	60.00
22	17.6	22.00	26.40	30.80	35.20	39.60	44.00	48.40	52.80	57.20	61.60	66.00
24	19.2	24.00	28.80	33.60	38.40	43.20	48.00	52.80	57.60	62.40	67.20	72.00
26	20.8	26.00	31.20	36.40	41.60	46.80	52.00	57.20	62.40	67.60	72.80	78.00
28	22.4	28.00	33.60	39.20	44.80	50.40	56.00	61.60	67.20	72.80	78.40	84.00
30	24.0	30.00	36.00	42.00	48.00	54.00	60.00	66.00	72.00	78.00	84.00	90.00
32	25 6	32.00	38.40	44.80	51.20	57.60	64.00	70.40	76.80	83.20	89.60	96.00
34	27.2	34.00	40.80	47.60	54.40	61.20	68.00	74.80	81.60	88.40	95.20	102.00
36	28.8	36.00	43.20	50.40	57.60	64.80	72.00	79.20	86.40	93.60	100.80	108.00
38	30.4	38.00	45.60	53.20	60.80	68.40	76.00	83.60	91.20	98.80	106.40	114.00
40	32.0	40.00	48.00	56.00	64.00	72.00	80.00	88.00	96.00	104.00	112.00	120.00

LABOR: INCLUDES MOUNTING PANEL AND CONNECTING OF EXISTING BRANCH CIRCUITS AND FEEDERS. (ADD FOR REMOVALS).

2-56

REWORK JOBS

PANELS MULTIBREAKER DISTRIBUTION
4 WIRE 3 PHASE SURFACE MOUNTED

PANEL SIZE	HRS. EA.	LABOR COST INSTALLED EACH AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
6	5.3	6.63	7.95	9.28	10.60	11.93	13.25	14.58	15.90	17.23	18.55	19.88
8	7.0	8.75	10.50	12.25	14.00	15.75	17.50	19.25	21.00	22.75	24.50	26.25
10	8.4	10.50	12.60	14.70	16.80	18.90	21.00	23.10	25.20	27.30	29.40	31.50
12	10.4	13.00	15.60	18.20	20.80	23.40	26.00	28.60	31.20	33.80	36.40	39.00
14	11.9	14.88	17.85	20.83	23.80	26.78	29.75	32.73	35.70	38.68	41.65	44.63
16	13.6	17.00	20.40	23.80	27.20	30.60	34.00	37.40	40.80	44.20	47.60	51.00
18	15.4	19.25	23.10	26.95	30.80	34.65	38.50	42.35	46.20	50.05	53.90	57.75
20	16.7	20.88	25.05	29.23	33.40	37.58	41.75	45.93	50.10	54.28	58.45	62.63
22	18.9	23.63	28.35	33.08	37.80	42.53	47.25	51.98	56.70	61.43	66.15	70.88
24	20.6	25.75	30.90	36.05	41.20	46.35	51.50	56.65	61.80	66.95	72.10	77.25
26	22.5	28.13	33.75	39.38	45.00	50.63	56.25	61.88	67.50	73.13	78.75	84.38
28	24.3	30.38	36.45	42.53	48.60	54.68	60.75	66.83	72.90	78.98	85.05	91.13
30	26.2	32.75	39.30	45.85	52.40	58.95	65.50	72.05	78.60	85.15	91.70	98.25
32	28.1	35.13	42.15	49.18	56.20	63.23	70.25	77.28	84.30	91.33	98.35	105.38
34	29.7	37.13	44.55	51.98	59.40	66.83	74.25	81.68	89.10	96.53	103.95	111.38
36	31.8	39.75	47.70	55.65	63.60	71.55	79.50	87.45	95.40	103.35	111.30	119.25
38	33.6	42.00	50.40	58.80	67.20	75.60	84.00	92.40	100.80	109.20	117.60	126.00
40	35.6	44.50	53.40	62.30	71.20	80.10	89.00	97.90	106.80	115.70	124.60	133.50
42	37.7	47.13	56.55	65.98	75.40	84.83	94.25	103.68	113.10	122.53	131.95	141.38

LABOR: INCLUDES MOUNTING PANEL, AND CONNECTING BRANCH CIRCUITS, AND FEEDERS. (ADD FOR REMOVALS).

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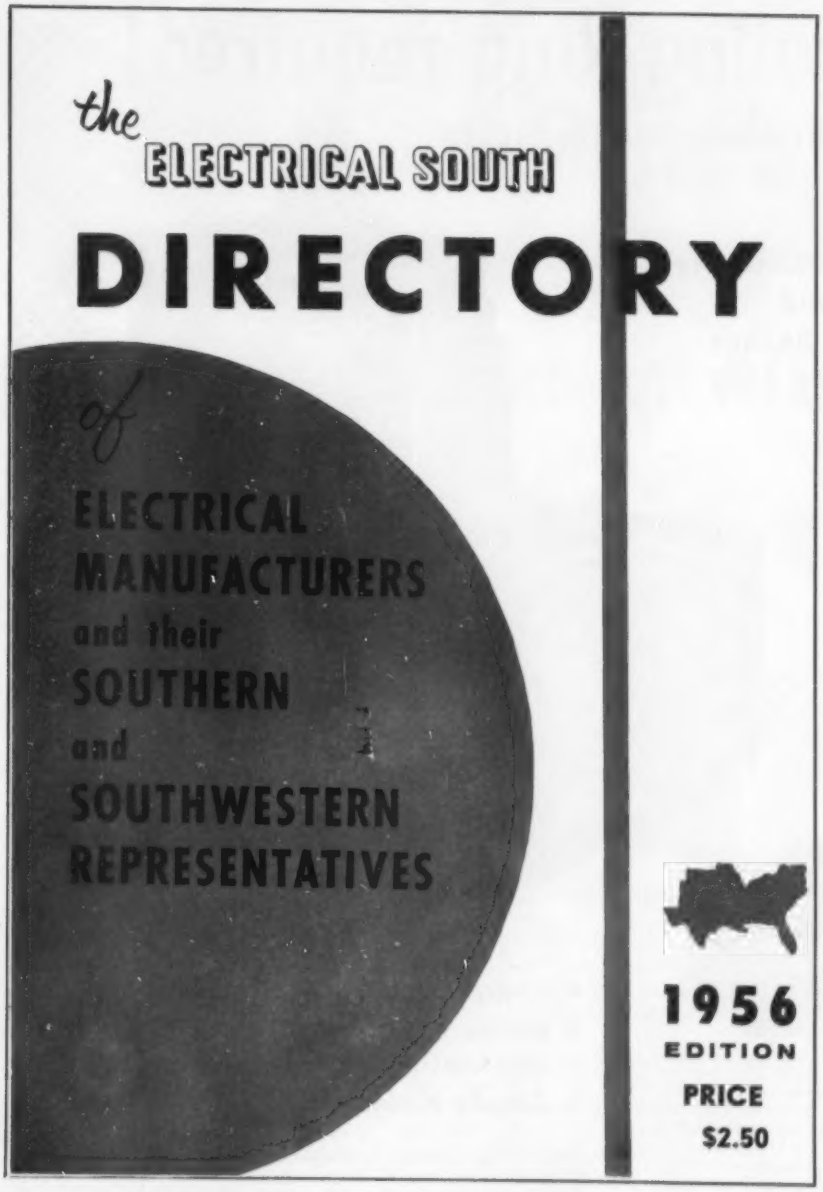

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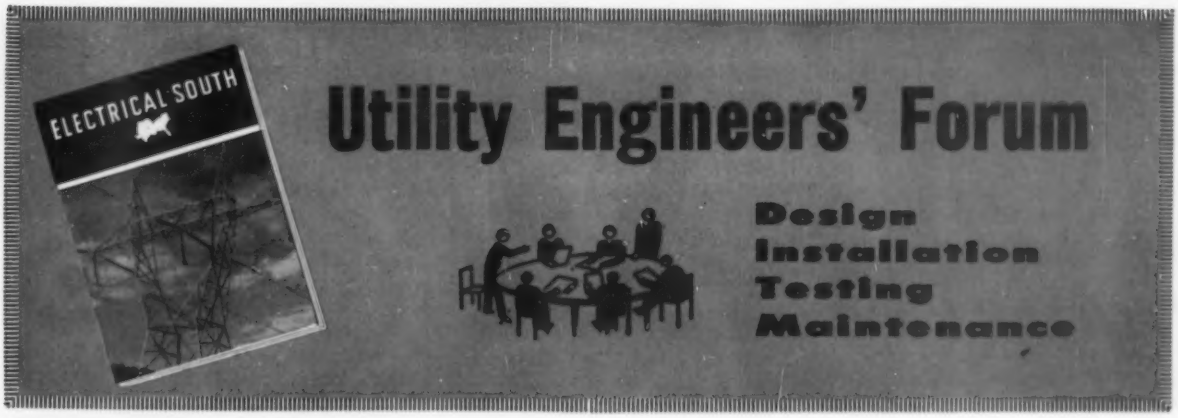

Record attendance at AIEE meeting

◆ ROGER M. BLOUGH, chairman of the board, U. S. Steel Corp., was the principal speaker at the opening session of the five-day Winter General Meeting, of the American Institute of Electrical Engineers at the Hotel Statler, in New York City, Jan. 30-Feb. 3. Mr. Blough's address was made at the opening general session on Monday afternoon.

The meeting broke all previous attendance and session records with more than 5,000 engineers, scientists, and industrialists attending 98 sessions, at which some 500 papers on all aspects of electrical engineering and the allied arts were presented.

Morris D. Hooven, president of the 49,000 member Institute, presided at the opening general session, during which James F. Fairman, vice-president of Consolidated Edison Company, New York, and a vice-president of the Institute, was awarded honorary membership in the Institute.

Two of engineering's major awards, the Edison Medal and the Alfred Noble Award, were presented during the meeting. The Edison Medal was presented to L. A. Umansky, of General Electric Company, Schenectady, N. Y., during a special session Tuesday afternoon. The Noble award was presented to R. L. Bright, of Carnegie Institute of Technology, Pittsburgh, during the opening general session on Monday afternoon.

A technical program of extraordinary scope and interest had been arranged by the Committee on Technical Operations, headed by J. D. Tebo, Bell Telephone Laboratories, with each of the 43 committees in the five broad fields of activity in the Institute, communications, general applications, industry, power and science and electronics, participating. Following are excerpts from some of the papers having special interest for light and power company engineers and operators.

Higher voltage urged for residential use

THE ELECTRIC utility industry should step up thinking and studies of the utilization of higher voltages for expanding loads in new homes.

This was among seven conclusions made by S. B. Griscom and R. F. Lawrence, of Westinghouse Electric Corp., in a paper, "Residential Distribution—An Analysis of Systems to Serve Expanding Loads," presented at a session on transmission and distribution.

The authors emphasized that the opinions they expressed about any change from the traditional 120/240 volt residential service in use in this country for many years were their own and summarized their study as follows:

The electric utility industry should accelerate its thinking and its studies of residential distribution to the end of determining now whether a new fundamental plan of distribution is desirable for expanding loads.

The industry (for example, by joint committees) should very carefully study the question of the feasibility of higher distribution secondary voltage from all angles to determine whether some of the anticipated drawbacks are real or imaginary.

An industry study should be made of mass-produced motor-driven appliances up to 15 hp for use in residences. The study should encompass motor and distribution system performance and costs to the end of determining whether single-phase or three-phase motors best reconcile the requirements of all parties concerned.

In the event that the answer to one is in the affirmative, every effort should be made to reconcile all viewpoints to the end that the new system be reasonably satisfactory to all, such that only one new standard would be involved, and it would have the prospect of being as long-lived as the present standard has been.

Any new system should offer sufficiently substantial savings that it would make it possible for the utility to aggressively seek new loads with profit—specifically, the home heating field.

It is the author's opinion that substantially - improved economy can be obtained by increasing the distribution system voltage, and that an approximately double voltage will suffice.

It is the authors' opinion that a three-phase, four-wire distribution

system with voltage in the general level of 265/460 volts is more economical than any other candidates. It is presumed that autotransformers would be used to serve lighting and run-of-mine small appliances.

Added fault protection needed for buildings

CAREFUL consideration must be given to the prevention and interruption of faults in electrical systems supplying power at higher voltages to large commercial building, electrical engineers were told during their AIEE Winter General Meeting.

The added precautions are necessary as commercial buildings are now using voltages in the vicinity of 265/460 volts, W. Deans, J. DeLellis and A. J. Bisson, said in a technical paper. Mr. Deans is vice-president, engineering, for the I-T-E Circuit Breaker Co., Philadelphia, and Mr. DeLellis and Mr. Bisson are in the electrical engineering department of Consolidated Edison Co., New York.

Complete fault protection is obtainable throughout such buildings by proper application of commercially available equipment, where large electrical loads have resulted from central air conditioning, high levels of illumination, and increased use of business machines, they reported at a symposium on industrial power systems.

Inspection important in petrochemical field

THE IMPORTANCE of electrical inspection in construction of a new petrochemical plant was emphasized at a chemical session.

Rigid electrical inspection "can do much to insure proper and safe installation of equipment and materials with resulting savings in time and money," N. D. Casdorph and J. H. Wieting, of Carbide & Chemicals Company, observed in describing inspection work during construction of a new company plant. "Proper inspection will reduce hazards; thereby safeguarding life and property."

Two important, intangible phases of the project which developed as construction progressed were relationship with the contractor and with the resident engineer. They said:

"It was of utmost importance that all contact with the contractor should be on a professional basis; that he be required to meet all specifications and make all installations in a workmanlike manner, yet be dealt with on a fair and friendly basis.

"Upon completion of a particular test, the resident engineer was notified in writing as to the results of each test with deficiencies noted as found. The contractor was furnished a copy of this report, and he then used it as a check-off list. In practice this made it easier for the contractor to schedule his work and thereby speed completion of the various installations."

The authors said that "hardly too much emphasis can be placed on the need for proper coordination between construction and operating forces where construction continues in an operating area. One moment's carelessness can result in disastrous accidents and loss of property. The electrical inspector can be of tremendous value in situations of this nature in that he can safeguard life and property."

Engineering training in power industry

FRANK E. SANFORD, assistant electrical engineer, Commonwealth Associates, Jackson, Mich., and author of several articles on engineering opportunities, reports that "The range of fields for application of engineering training and experience in the electric utilities is almost without parallel in any other industry."

Despite these opportunities, he said in a paper entitled "Needs and Supply of Engineers for Electric Utilities," presented at an education symposium at the AIEE Winter General Meeting, the need for young graduate engineers in the electric power industry is not being met.

"There are numerous indications that 60-cycle power supply is failing to attract the numbers of electrical engineering graduates that are needed in the industry," he said. "Recruitment for electric utility employment as well as reports from the colleges point to a shortage that may be realized more in the next five or ten years than it is at present.

"While exact statistics are not available, some approximations lead to the conclusion that 15 or 20 per cent of the electrical engineering graduates of the present period are needed. Far less than this number are interested in power now and the increase in prospective supply will not in itself meet the needs unless the percentage can be increased also."

Mr. Sanford pointed out that normal retirement among the estimated 16,000 to 25,000 engineers in the power industry, will require replacement of between 500 and 750 engineers each year and "to overcome some past lag in the program would result in a total of 800 to 1,250 graduates employed each year."

It is expected, however, that the increase in engineering graduates after 1958 might lessen the recruitment problem, he said.

Current limiting fuses for industrial systems

USE of current limiting fuses in combination with circuit breakers to protect electrical buses, such as used in industrial plants, from damage caused by short circuits, was advised during the AIEE Winter General Meeting.

This conclusion was reached by J. B. Cataldo and N. Shackman, of Bulldog Electric Products Co., Detroit, Mich., in a paper they presented at a symposium on switchgear. The conclusion represented the results of research into the best methods of protecting both feeder and plug-in buses. Mr. Cataldo is director of research for his company and Mr. Shackman is a development engineer. Title of their paper was "Short Circuit Protection of Busway Systems With Current Limiting Fuses."

The best possible protection against short circuits is of prime importance to both users and manufacturers of busways systems, they pointed out, adding that "The importance of preventing fault current damage to the busways system arises from the necessity of protecting plant personnel, the high replacement cost of the equipment itself, and the financial and productive losses occurring

through the forced inactivity of large sections of the industrial plant."

Their investigation brought them to the following conclusions:

"Busway systems can be employed where available fault currents are in excess of their ratings when protected by current limiting fuses.

"Maximum protection against arcing faults is obtained by employing the lowest size current limiting fuse consistent with the overload characteristics of the circuit.

"The combination of current limiting fuses and circuit breakers provides the maximum over-all protection for busway systems.

"Added protection for existing busway systems can be accomplished practically and economically."

Thermal overload relay for motor controllers

A NEW COMBINATION thermal overload relay useful in controllers for a wide range of electric motors and particularly appropriate in high-voltage, high interrupting capacity controllers, was announced at the AIEE Winter General Meeting.

The relay, said W. L. Smith and C. A. Lister, of Electric Controller & Manufacturing Company, Cleveland, "has a separate, fast acting, magnetic section for tripping on fault currents. The thermal and instantaneous sections have separate adjustments, and each section is equipped with individual snap-action contacts. When adjusted for 125% current trip setting, the relay permits relatively long times for motor starting. For special applications, the relay can be furnished with ambient temperature compensation. The relay is built to withstand fault currents for the length of time required by a controller to clear the fault."

Thermal relays, it was explained in the authors' technical paper "New Thermal Overload Relay With Instantaneous Magnetic Trip on Faults," are commonly used in motor starters to sense motor temperature and to initiate disconnection when safe operating temperatures are exceeded. Additional magnetic relays are used for fault protection at high current.

Multiplex aluminum for service drops

ALUMINUM multiplex cable for electrical service drops from distribution lines to buildings, and for secondary distribution was described as "a young but healthy and vigorous growing child" in the family of conductors for that use.

The description was given by L. F. Roehmann, of the Kaiser Aluminum & Chemical Co., Spokane, Wash., in a paper, "Current Rating of Aluminum Multiplex Cable," presented at a session on insulated conductors.

"Basically," he said, "the cable consists of one control conductor, usually bare electrical conductor (EC) grade aluminum or bare aluminum steel reinforced (ACSR) which serves the dual function of neutral and messenger. Around this conductor are cabled one insulated aluminum power conductor in Deplex, two conductors in Triplex and three conductors in Quadruplex." Maximum operating voltage is 300 volts to ground.

Mr. Roehmann described laboratory tests to secure the current rating of this type of cable, but said that the data "must be considered raw material, and appropriate safety factors should be 'built in' by the authorized specification writing bodies, prior to the issuance of rating specifications."

Power influence on TV interference

GENERATION of very high frequency noise does not appear to be inherent in the transmission of electrical power, two engineers from the Hydro-Electric Power Commission of Ontario, reported at the AIEE Winter General Meeting.

The engineers, J. R. Leslie and P. W. Waddington, both of Toronto, said the investigation was made to ascertain the noise influence of power transmission on mobile radio and television. Using a noise meter on a live-wire stick, the investigators surveyed 148 poles of a 12.7 kv transmission line, and on 27 kv and 44 kv lines.

Although in general they concluded that power transmission itself has little effect on radio or television reception, they did find that the "hardware" used to suspend the power lines caused some interference when it was not in good working order.

The investigation was made despite the fact that very few complaints had been received, it was reported in their paper, "Field Studies of Noise at Television Frequencies from Power Circuits."

Loose hardware that produces noise does not in general contribute to radio interference, it was found.

Noise and appearance, substation problems

SEVERAL METHODS of overcoming public objection to distribution substations in residential or commercial areas were outlined during a symposium on substations.

As utility loads have continued to grow, it has become necessary to construct substations closer together and often in areas near residences or commercial buildings, leading to objections because of appearances or noise, it was pointed out in a paper by six engineers from various utilities and two manufacturers of substation transformers, entitled "Location and Design of Distribution Substations in Residential Areas."

Major steps in making the substation non-objectional are to improve its appearance by landsc ping, or enclosing it in a building similar to buildings of the neighborhood, and by attenuating or masking the noise emanating from the transformer—a 120 cycle sound.

The authors urged that special attention be given to appearance and noise when a substation must be erected in a residential neighborhood.

REA's using higher distribution voltage

INCREASED use of higher voltages for distribution on Rural Electrification Administration electric systems was predicted at the AIEE Winter General Meeting.

The forecast was made by W. M. Edmonds and L. B. Crann, REA Engineers, who related seven

(Continued on page 86)

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THE HIDDEN VENTILATOR

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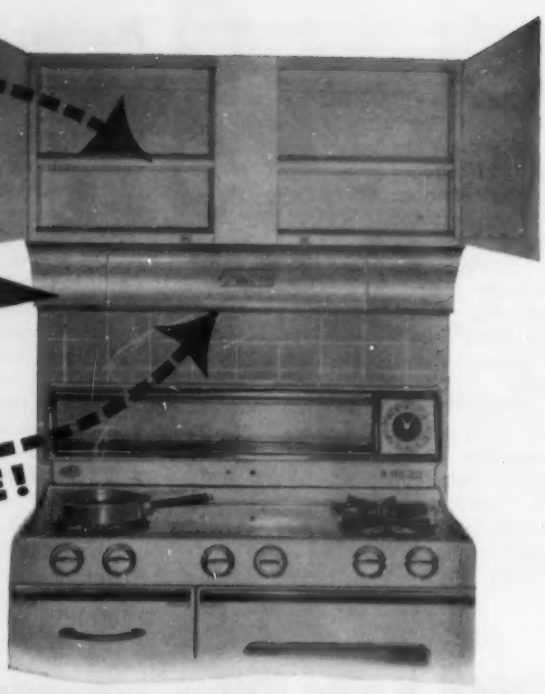

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Fingertip control of ultra high, normal and low ventilator speeds; plus under-hood light.

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Fundamentals of substation design

Part 3

by Henri A de Bonneval*

Tables 5, 6, 7, 8, and Figure 11 give the over-all dimensions of the principal equipment currently used in the design of substations. The dimensions given do not apply to any particular manufacturers and should be used only as a general guide to determine the over-all space requirements.

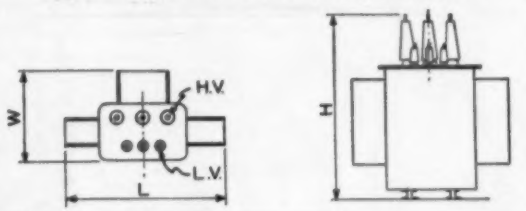
Table 9 lists the maximum recommended deflection with or without wind and ice load. The general loading map, Figure 12, shows the territorial division of the United States with respect to the loading requirements of bus construction.

It will be noted from the tables on bus deflections and current capacity, that the size of the bus selected will be mostly based on the allowable deflection rather than its current capacity. It is usually more economical to select a tubular bus of larger diameter in order to reduce the number of supports to that within the recommended bus deflection, than to select the bus on its current carrying capacity alone. A larger diameter bus not only permits a longer span, but at high voltages reduces the corona power losses. A number of heavy taps on the bus will also influence the allowable span to avoid excessive sag. Excessive deflection is unsightly and provides points of dripping, with the possible formation of icicles which may cut down the clearance and cause flash-overs.

To avoid the accumulation of rain water or condensation in a tubular bus, the ends should always be sealed. The accumulation of water in the pockets will increase the sag and damage the bus

*Mr. de Bonneval is associated with the J. G. White Engineering Corp., New York City, N. Y.

Table 5—Three-phase power transformer, liquid immersed, self cooled, outdoor



H.V. KV.	BIL	KVA	H (in.)	L (in.)	W (in.)
5.0	75	750 & 1,000	90	110	65
		1,500	110	115	65
8.7	95	1,000	90	110	65
		1,500	110	115	65
		2,000	110	130	65
15	110	1,000	90	110	65
		1,500	110	115	65
		2,000	110	130	65
		2,500	120	135	75
		3,750	125	140	75
23	150	1,500	110	120	65
		2,500	125	140	75
		3,750	150	145	75
		5,000	150	155	80
		7,500	155	160	105
		10,000	175	160	105
34.5	200	2,500	140	130	70
		3,750	155	135	75
		5,000	155	150	80
		7,500	160	160	105
		10,000	175	165	110
46	250	2,500	145	135	75
		3,750	165	150	80
		5,000	165	155	85
		7,500	165	160	100
		10,000	180	170	110
69	350	2,500	185	135	70
		3,750	195	145	80
		5,000	210	155	80
		7,500	210	170	90
		10,000	215	180	95

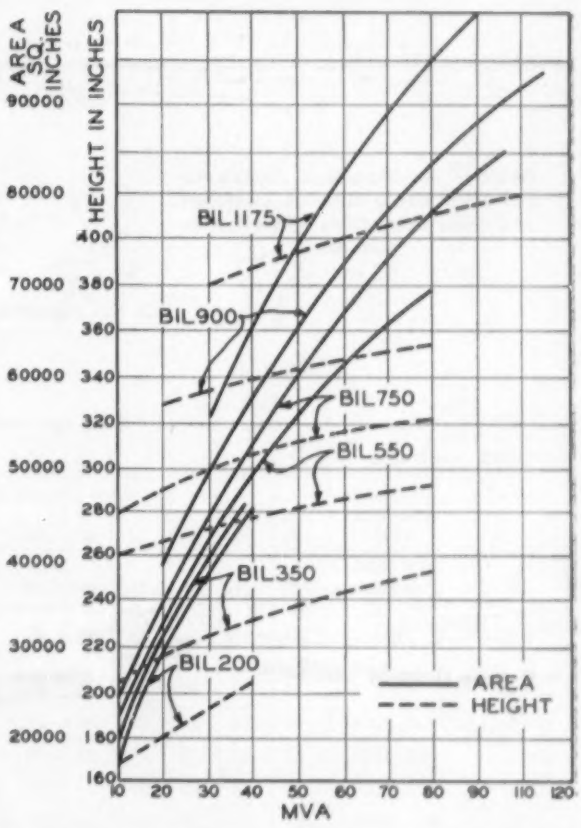


Fig. 11. Approximate floor area and over-all height of large size power transformers rated three-phase, 60 cycle, self cooled.

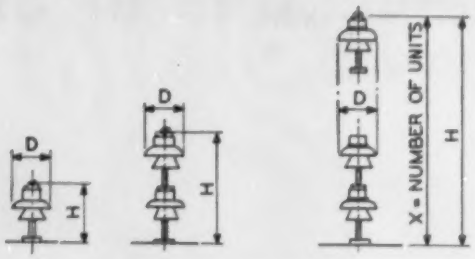
in freezing weather. It is good practice to drill a hole (¼" approximately) at the point of greatest sag to provide drainage.

Another important consideration in the design of outdoor buses is the expansion of the bus brought about by the change in ambient temperature and the current carried by the bus. A 100-foot length of bus will expand 1.12 inches for a temperature rise of 100 F., and an aluminum bus will increase 1.32 inches.

Moreover, the difference of expansion between the steel structure and the copper bus to which it is rigidly clamped, may cause destructive strains unless provided for. Accordingly, it is recommended that the bus be connected to the equipment by means of a cable, or an expansion stud, or a flexible strap connector. Also, in order to avoid any excessive longitudinal strain in rigid bus design, it is a good "rule of thumb" to provide an expansion coupler for every 70 feet of straight bus.

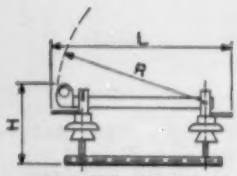
It is also recommended that the assembly work be done with the

Table 6—Outdoor post type insulators

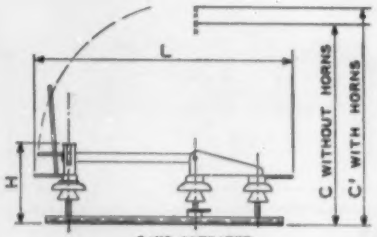


KV. rating	BIL KV	Units per stack	Height (H)	Maximum diameter (D)
7.5	95	1	9	8
15	110	1	11	10
23	150	1	13	11
34.5	200	1	16	14
46	250	1	20	14
69	350	2	30	18
115	550	X = 3	46	18
161	750	X = 4	60	20
196	900	X = 5	74	20
230	1050	X = 6	90	20
287	1300	X = 8	120	20

Table 7 — Standard clearance between centerline of switches and from centerline of switch to ground



HOOKSTICK OPERATED



GANG OPERATED

KV rating	Amp. rating	Hookstick operated			Gang operated				Min. clearance to ground (in.)	Minimum center line spacing	
		L	H	R	L	H	C	C'		Hookstick & gang operated discon. Sw. & Bus. (in.)	Horn gap switches (in.)
7.5	400, 600 1200	21	12	20	38	19	36	42	6	18	36
15	400, 600 1200	24	15	23	38	21	39	45	8	24	36
23	400, 600 1200	27	18	26	42	23	44	50	11	30	48
34.5	400, 600 1200	34	24	32	48	25	53	59	14	36	60
46	600, 1200	40	28	34	58	30	62	69	18	48	72
69	600, 1200	51	42	50	84	47	89	99	24	60	84
115	600, 1200	76	60	68	96	64	115	126	39	84	120
161	600, 1200	100	84	92	120	78	154	164	51	108	168
196	1200	—	—	—	132	83	180	190	60	128	190
230	1200	—	—	—	150	110	210	220	71	150	216

clamps loose enough to permit longitudinal adjustment; then only, secure tightly the whole bus assembly when an average temperature exists. Buses of structural shape should be allowed freedom of linear movement, except at anchor point; otherwise, destructive forces may be exerted on the supports at extremes of temperature.

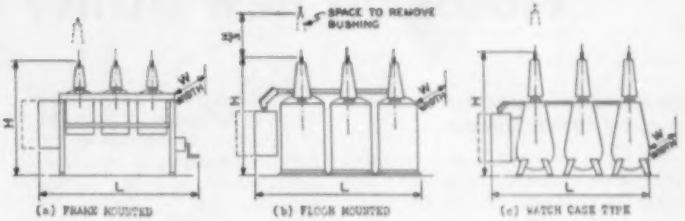
The improvement of the design of the disconnect switch has done much to change the design of outdoor substations. The early disconnect switches were generally of the hooked stick operation type. This precluded the possibility of mounting them high on the structure, since they could not be readily operated with a stick of reasonable length. Also, sufficient space had to be provided so that they could be operated safely.

The new gang operated disconnect switch, either manual through means of linkage or motor operated, permits much greater latitude in locating this equipment, with a corresponding gain in space and safety. Moreover, these switches can be locked securely, or interlocked to avoid faulty operation. Auxiliary contacts on the switch can remotely indicate the position of the switch. With gang operation, equipment cannot be connected without all of the switch blades being in the same position. Disconnect switches may be provided with horns so that they may be operated under limited load, such as the exciting current of a large-size transformer.

In some cases, the motor operated transfer switch may be used in lieu of a circuit breaker, but it should be borne in mind that these switches are not designed to operate under overload or fault conditions. Motor operated discon-

(Continued on page 86)

Table 8—Outdoor power circuit breaker, oil type



Rated KV	Current rating amps	Interrupting rating 3ϕ MVA	Item	H (in.)	L (in.)	W (in.)
7.2	600	50	(a)	92	30	36
14.4	1200	1,000	(a)	130	152	50
14.4	2000-4000	1,500	(a)	130	180	54
23	1200	500	(a)	120	120	46
34.5	2000	2,500	(a)	134	184	54
46	1200	1,500	(a)	188	167	48
69	600-1200	1,500	(a)	174	184	54
69	1200	2,500	(a)	179	210	56
69	2000	3,500	(b)	140	220	58
115	1200	3,500	(b)	161	231	64
138	1200	5,000	(b)	177	264	70
161	1200	5,000	(b)	196	264	74
230	1200	10,000	(c)	234	290	100

Fig. 12. District loading map of the United States for mechanical loading of overhead lines.

Table 9—Minimum size pipe within recommended maximum deflection

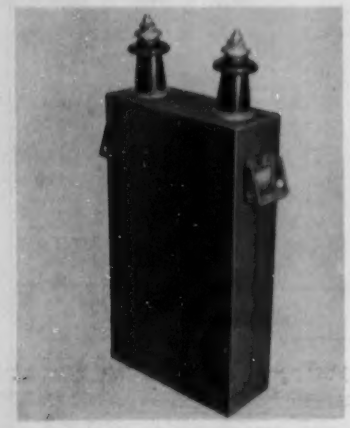
Span in feet	Recommended max. deflection inches	Copper tube				Aluminum tube			
		Bare		8 lb. wind ½" ice		Bare		8 lb. wind ½" ice	
		I.P.S.	X.H.I.P.S.	I.P.S.	X.H.I.P.S.	I.P.S.	X.H.I.P.S.	I.P.S.	X.H.I.P.S.
5	0.4	⅜"	⅜"	⅜"	⅜"	⅜"	⅜"	⅜"	⅜"
10	0.8	½"	¾"	1"	1"	⅜"	⅜"	1"	1"
15	1.2	1¼"	1¼"	1½"	1½"	¾"	¾"	1½"	1½"
20	1.6	2"	2"	2½"	2½"	1¼"	1¼"	2½"	2½"
25	2.00	2½"	3"	3"	3"	2"	2"	3"	3"
30	2.40	3½"	4"	4"	4"	2½"	3"	4"	3½"

Notes on new utility equipment

50-kvar power capacitor offered by Westinghouse

A NEW 50-kvar power capacitor for voltages from 2400 to 7960 volts is available from Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

Designed to permit utilities to place more capacity on limited pole space,



the new units have a lower installation cost per kvar, and provide more kvar capacity per pound.

The capacitors can be installed in the 1- and 2-unit racks presently used for 25-kvar units. The 3-4 unit racks now in use will take 3 of the new 50-kvar units.

The new capacitors retain the solder-sealed bushing and the zinc-spray finish used on previous units. Mounting lugs are equipped with lifting eyes to facilitate handling by hook or sling.

Higher ratings given distribution regulators

SIX NEW higher ratings of single-phase distribution regulators designed to provide economies in distribution regulation which can be engineered into most utility systems have been announced by Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

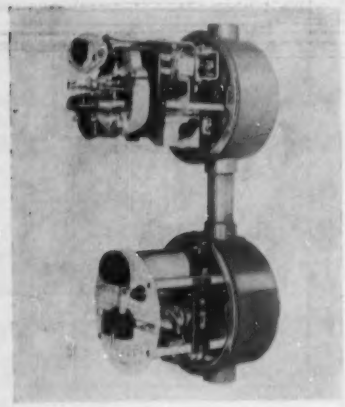
Ratings of the new regulators are 37.5 kva, 150 amps, 75 kva, 300 amps, 100 kva, 400 amps, all 2500 volts; 75 kva, 150 amps and 100 kva, 200 amps, 5000 volts; and 167 kva, 219 amps, 7620 volts.

The new regulators are designed with "Vari-Amp" ratings to carry 160 per cent rated load not to exceed 400 amperes at plus-or-minus 5 per cent regulation.

Single-phase distribution regulators with price savings up to half of three-phase regulators have other definite advantages even though their installation costs may be higher. For example, they provide individual phase regulation; they may be by-passed for maintenance inspections while the substation continues to carry its load, and the cost of replacement equipment or spares is less. In addition, the regulators need not be placed in the substation but can be installed on the line closer to the load which they serve.

New type voltage control offered by Line Material

A CURRENT-MODIFIED voltage control, designed to actuate oil switches for capacitor bank operation, is being offered by Line Material Co., Milwaukee, Wisc. It consists of a voltage control and a current control. The voltage control directly initiates switching action. However, the current control changes the operating level of the voltage control by removing or inserting a bias voltage. The design simplicity of this economy device affords years of maintenance-free service.



The current control has a minimum band width of ¼ ampere over a full scale of 5 amperes, a thermal element that provides time delay, and a fuse for the control circuit. This unit is mounted in a standard six-prong meter base and protected by a glass cover.

The voltage control has a 1½- to 12-volt adjustable band width, an operating range from 110 to 130 volts, a time delay of about 60 seconds, and a rheostat to adjust the bias voltage. Rugged 20-ampere load contacts, fuses for both load and control circuits, and a lightning arrester are also included. It is mounted in a standard six-prong meter base and protected by a weatherproof aluminum cover.

New, permanent cable tap cuts installation time

A UNIQUE DEVICE for making permanent, weatherproof cable taps without severing the cable or stripping leads has been developed by the Jerrold Electronics Corp., 23rd and Chestnut Sts., Philadelphia 3, Pa.

Developed originally to connect individual service drops to the main feeder cables used in community television antenna systems, the new Jerrold pressure tap likewise presents interesting possibilities as a low cost tap for utility, telephone, and control system cables. Either coax or single-conductor solid or stranded cables may be used with the tap. When coax is used, connection is automatically made to the center conductor as well as to all outer conductors. Shunt capacitance is held to less than 1.5 micromicrofarads.

The Jerrold pressure tap greatly reduces the time "on the ladder" required to make a permanent cable connection. One bolt securely clamps both the pressure tap and the feeder cable to the messenger wire. A special cutting tool is then screwed into the tap to pierce the outer jackets. After the cutting tool is removed, the service drop connector is screwed into the tap forming a positive, low-loss connection between the feeder cable conductor and the service drop.

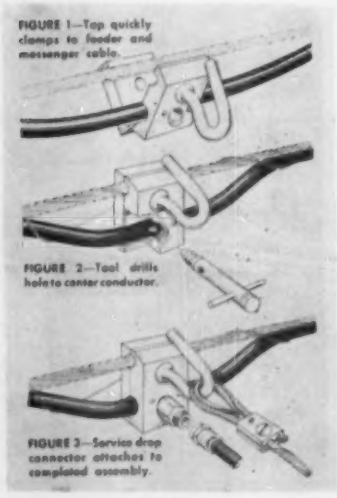


FIGURE 1—Tap quickly clamps to feeder and messenger cable.

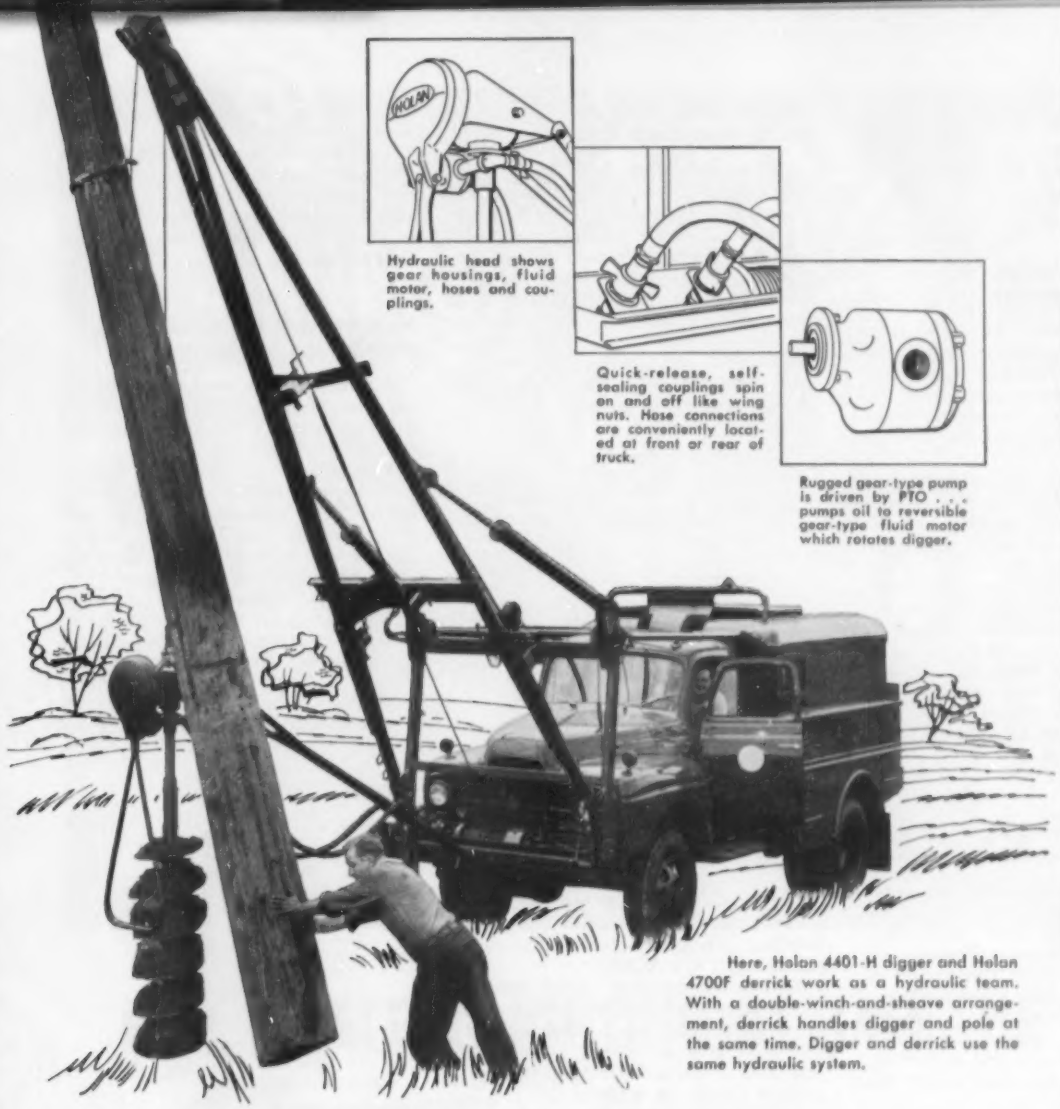
FIGURE 2—Tool drills hole to center conductor.

FIGURE 3—Service drop connector attaches to completed assembly.

Hydraulic head shows gear housings, fluid motor, hoses and couplings.

Quick-release, self-sealing couplings spin on and off like wing nuts. Hose connections are conveniently located at front or rear of truck.

Rugged gear-type pump is driven by PTO . . . pumps oil to reversible gear-type fluid motor which rotates digger.



Here, Holan 4401-H digger and Holan 4700F derrick work as a hydraulic team. With a double-winch-and-sheave arrangement, derrick handles digger and pole at the same time. Digger and derrick use the same hydraulic system.

HYDRAULIC POWER MAKES BORING JOBS PLEASANT

Holan's new hydraulic digger is smooth going down. In fact, the 4401-H digs holes so easily that you appreciate most what it doesn't do. It doesn't vibrate and tire the workmen. It doesn't create mechanical stresses when stalled. And it doesn't require a lot of maintenance — there are no bearings, no universal joint, no shear pin, no complicated mechanical linkages. Putting it positively, the 4401-H makes hole-digging anywhere easier than ever before.

The Holan 4401-H Hydraulic Earth Borer digs holes from 8 to 20 inches in diameter and up to eight feet deep. Write for the new catalog.

Line construction bodies for light to heavy-duty. Crew compartments optional. Efficient tool compartments and drawers.

Service bodies for chassis up to 1½ ton. Lengths, 72", 75", 84", 90", and 102".

Hydraulic derricks designed for rear mounting. Capacities to 12,000 lbs. Also, light-duty, power-operated derricks.

Ladders to 40' with all phases completely hydraulic. Pump actuated by P.T.O. or separate engine drive with electric starter. Also, expertly-engineered mechanical ladders to 32'.

Portable mechanical and hydraulic earth borers with optional rotation.

Hydraulic towers from 17' to 30' with rotary, stationary, or transverse platforms. Exclusive box-girder telescoping mast.

J.H. HOLAN CORPORATION

4100 WEST 150TH STREET
CLEVELAND 11, OHIO

OTHER PLANTS:
HOLAN Thrift Line CORP., Griffin, Georgia • J. H. HOLAN CORP., Phoenix Div., Arizona
BRANTFORD-HOLAN LIMITED, Brantford, Ontario

THE NAME THAT MEANS WORK SIMPLIFICATION

The service drop messenger hook and connector permit servicing, testing, or disconnecting the service drop without disturbing the pressure tap or its weatherseal.

G-E changes design of 50-kvar capacitor

GENERAL ELECTRIC's new 50-kilovar power capacitors, first in the industry when trial models were announced last September, have had their dimensions altered to make them fit racks designed for 25-kvar units.

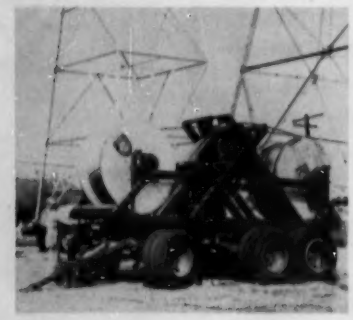
Utility customers definitely favored the increased rating, but expressed a preference for interchangeability, according to the G-E Capacitor Department at Hudson Falls, N. Y.

The new unit will have the same high operating reliability and the same base dimensions as the 25-kvar model, but will be 11 inches taller, 32 inches to top of bushings. It will weigh about 110 lbs.—considerably less than twice the 25-kvar capacitor's 68 lbs. The new units are available in 5 and 8.7-kv classes.

Machine for stringing power line conductors

A NEW machine for stringing overhead power line conductors under controlled tension has been announced by the Petersen Engineering Co., Santa Clara, Calif. Designated as Model 6000-WS, this machine takes all conductor sizes up through Pheasant (1⅜" diam.) and any standard size and type of reel that are currently being supplied from the wire mills.

The braking takes place over the double bull wheels that are of cast aluminum alloy and are Neoprene lined to prevent damage to con-



ductors and slippage. One reel tender can easily control the brakes on one of these units holding two reels, or on two units, if placed close together, stringing up to 4 conductors simultaneously. The control of the conductors is so positive and excellent that the operation of the machine is unbelievably smooth.

Wire-holding stick for use on energized lines

THE WIRE-HOLDING stick, a new tool developed by the A. B. Chance Co., Centralia, Mo., is used on or around energized lines for forming, bending, and positioning jumper wires; for holding conductors during splicing operations; and for pulling tie wires tight before tying.

This tool has many other similar applications and can often be used on jobs formerly done by hand. It is strong enough to bend 4/0 ACSR.

The gripper, equipped with an eye so that other sticks can assist with bending, can handle No. 8 solid copper through 4/0 ACSR.

This quick-opening, quick-closing tool is simple to operate. To open the gripper, the wing nut is loosened and the hand grip is rotated to the left and slid upward. Reversing the operation closes the gripper.

The voltage-tested, laminated pole is coated with "Maplac" plastic to seal out moisture and reduce abrasion. Aluminum and bronze castings are used.

Allis-Chalmers redesigns its current transformers

REDESIGN of core, coils, and insulation of current transformers for use in Allis-Chalmers 600, 4160, and 13,800-volt switchgear has been announced.

Configuration of the core for both low and high voltage current transformers utilizes a "U" and "I" shaped lamination design for greater efficiency and easier assembly.

Secondary winding on the window type transformer is of heavy Formvar insulated wire. The entire assembly is cast in a resin forming the insulation between the turns of the secondary winding, the secondary winding and the core, and the secondary winding and the primary bus bar. The opening formed by the bakelite sleeve, which is cast in the center of the transformer, permits the entire assembly to be slipped on the switchgear bus and locked into position by a single bolt.

This construction provides for better heat dissipation, increased dielectric strength, and for easier installation or replacement. Further details available from Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

New bracket for mounting distribution insulators

A NEW pole top bracket for mounting post type distribution insulators is announced by the Lapp Insulator Co., Inc., Le Roy, N. Y.

The bracket is designed for use with Lapp's recently introduced distribution post insulators (20 kv and 27 kv ratings) and for sub-transmission service with line post insulators up to and including 35 kv.

The new bracket and 27 kv distribution post are REA approved.

Brackets are recommended for use with post type insulators in conventional pole top construction with crossarms, or for an optional, low-cost method of construction with insulators mounted horizontally directly to pole.

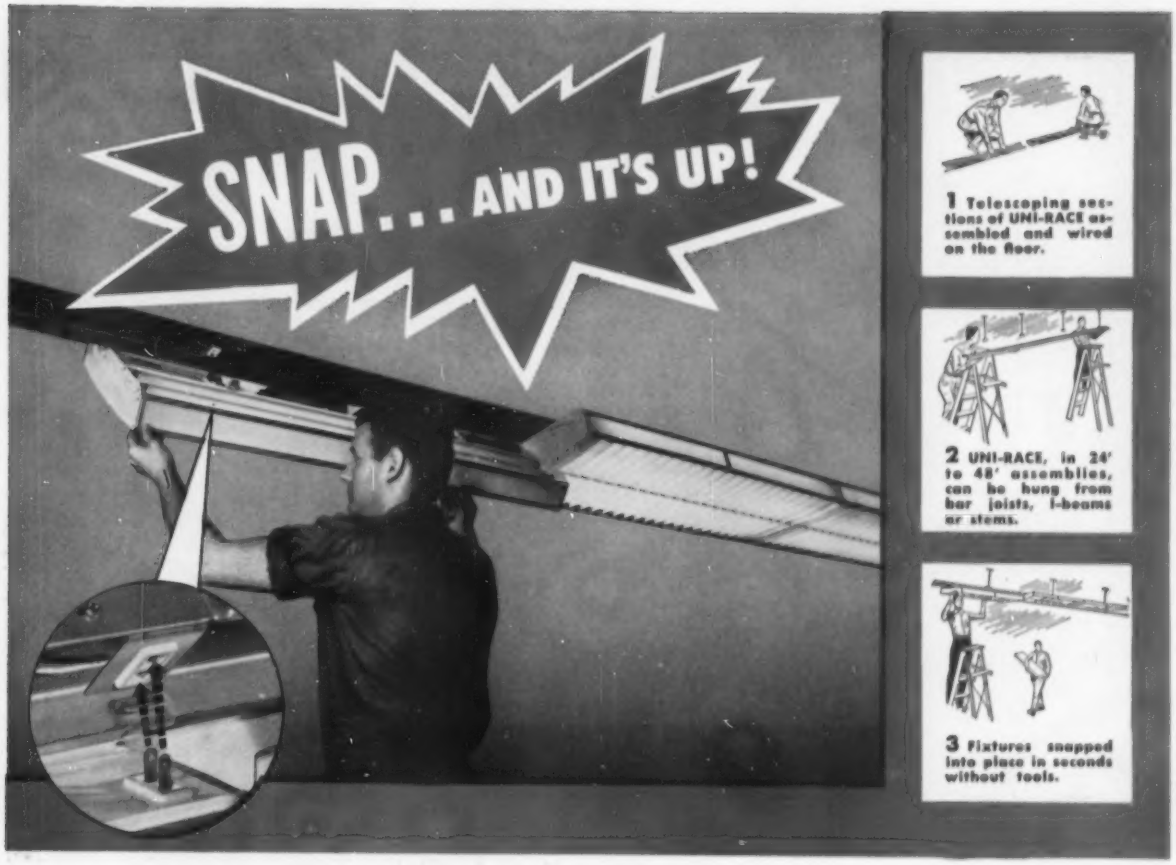
The unit is pressed steel, ribbed for increased strength and hot dip galvanized. Two strength ratings are given—1500 lbs. cantilever with posts through 27 kv rating, 1000 lbs. cantilever strength with 35 kv post. Three 11/16" holes for mounting to pole allow choice of 5" or 8" spacing.

Tank hoist developed for Kyle Type R recloser

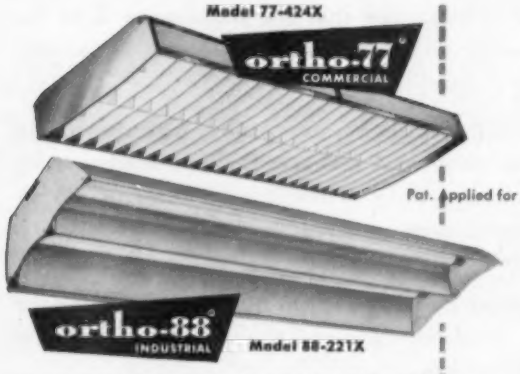
A TANK HOIST, to facilitate periodic inspection of pole-mounted Kyle Type R reclosers, has been developed

(Continued on page 86)

telescoping mast.


SNAP... AND IT'S UP!
1 Telescoping sections of UNI-RACE assembled and wired on the floor.
2 UNI-RACE, in 24' to 48' assemblies, can be hung from bar joists, I-beams or stems.
3 Fixtures snapped into place in seconds without tools.

HERE'S BETTER LIGHTING AT HALF THE COST



The Gibson ORTHO Fixture is a completely new concept in commercial and industrial lighting design. The exclusive UNI-RACE, shipped separately from the fixtures, provides straight alignment, exact fixture spacing and a fixed power source (receptacle) for each fixture. It banishes those pesky aligning problems and eliminates all electrical work on the fixture itself—just take the units as they come from the box and snap into place at any desired interval of 4′ or 8′ on the UNI-RACE.

All of which adds up to a 50-percent saving in labor and material—often more—unheard of flexibility to the user, and gives you a better-looking, higher-quality job.

There are many other advantages you ought to know about. Drop us a line today, we'll gladly send you complete information about the remarkable new ORTHO-77 and 88 for commercial and industrial applications.

FEATURES THAT DEFY COMPARISON

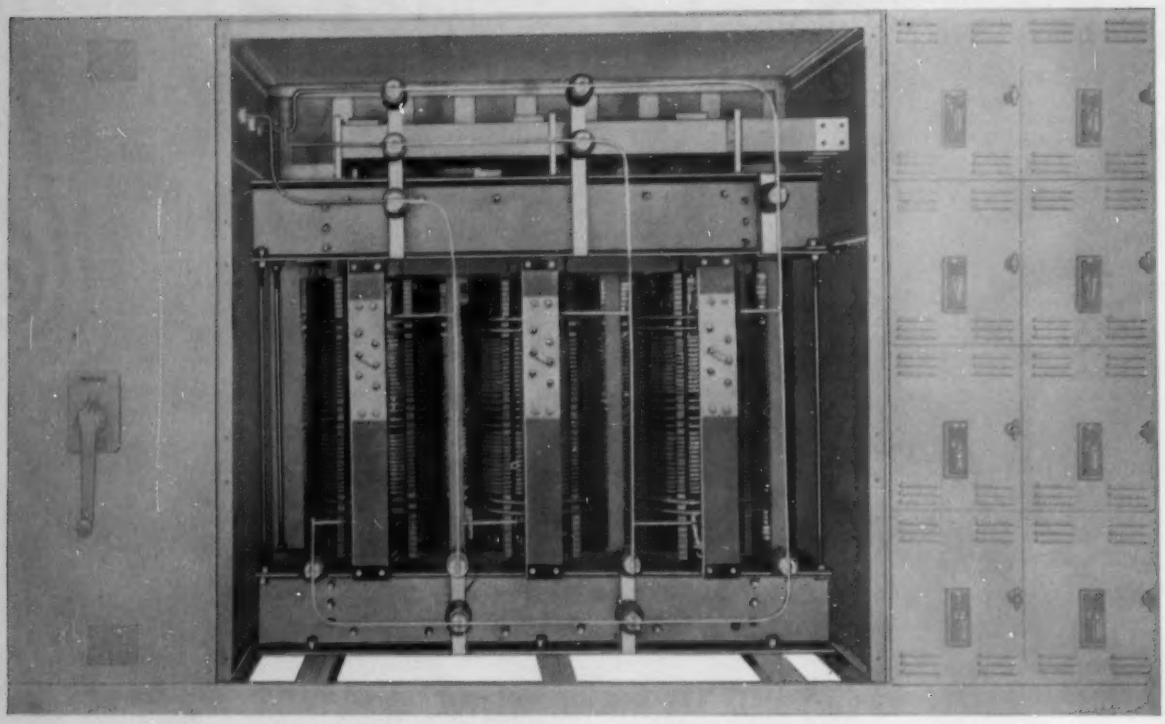
- **ON-JOB POWER SOURCE** Before fixtures are installed, receptacles in UNI-RACE provide power source for tools and temporary lighting.
- **NO FIXTURE STORAGE** Fixtures need not be delivered until premises are painted. The units can then be snapped into place—clean and factory fresh.
- **VARIABLE SPACING** Fixtures can be mounted in continuous rows or at intervals of 4, 8, 12 or more feet—added, removed or respaced at any time.

Gibson LIGHTING

GIBSON Manufacturing Co.

1919 Piedmont Circle, N.E. Atlanta 9, Georgia

The transformer is the heart of a substation



1000 Kva 13,200 volt Sorgel dry-type transformer in a substation — Compartment panel removed

500 Kva, 3-phase, 4160 to 480 Volt Askarel-cooled transformer, with primary and secondary throats

A substation is no better than its transformer; therefore, it is important that the transformer is of the best quality — a SORGEL transformer, either dry-type or Askarel-cooled.

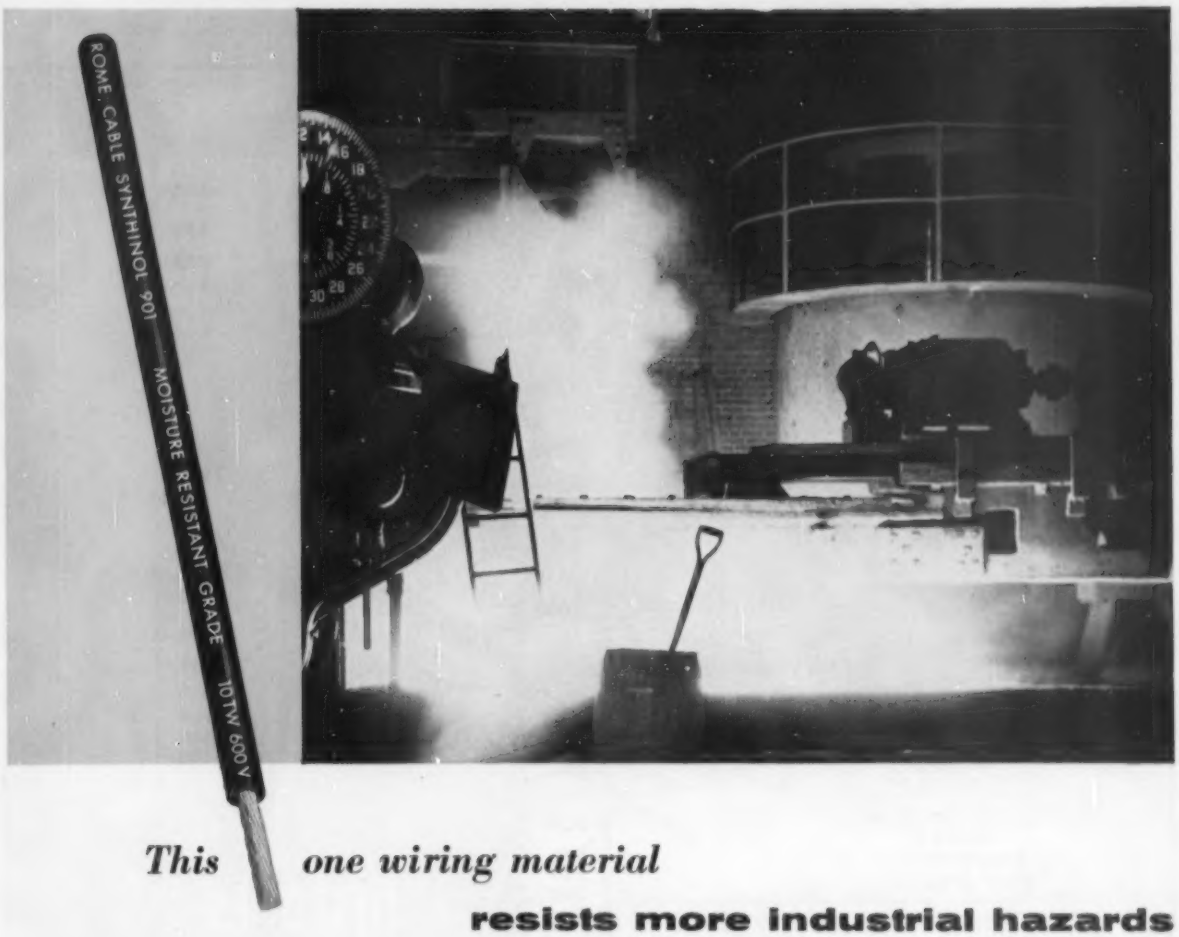
Sorgel transformers are top quality, time tested, and are thus recognized and accepted by discriminating engineers and users. Their rugged construction assures continuous, reliable service. Their design is liberal. Efficiency is high. Quiet operation.

The Sorgel Electric Co. has 40 years of experience in the development, manufacturing and application of transformers.

Sorgel transformers, sizes 100 to 3000 Kva, all voltages up to 15,000 volts, either dry-type or Askarel-cooled, are procurable with any make or type of switchgear, and from any substation manufacturer.

Sales Engineers in Principal Cities

SORGEL ELECTRIC CO., 835 West National Ave., Milwaukee 4, Wisconsin



This one wiring material
resists more industrial hazards
than any other

You get these important approvals with this multi-purpose wire:

- U/L approval as Type TW for 60° C. under the National Electrical Code
- Conforms to standards of National Machine Tool Builders Association for machine tool wire
- U/L approval as appliance lead wire for 600 volts at 90° C. through size 4/0 AWG and for 105° C. on sizes No. 24 through No. 8 AWG

. . . a single versatile thermoplastic construction, Rome Synthinol® 901.

For the really tough jobs in industry . . .

If your wiring must withstand the deteriorating effects of cutting oils and solvents, acids or other chemicals, greases, moisture, steam, corrosive fumes, abrasion, flame, it will pay you to use Rome Synthinol 901. It's made for the "hot spots" in industry—chemical plants, refineries, paper mills, and the like.

These outstanding characteristics have been proved time and again *in actual use.* They're not claims based only on laboratory tests.

Refineries are typical . . .

In refineries, at the bulk loading stations, Rome Synthinol 901 has been continuously exposed to the damaging effects of *heat and oil.* Its inherent resistance to both enables Synthinol 901 to take this punishment indefinitely.

In chemical plants . . .

One source of explosion hazard in chemical plants is hydrocarbon oils. Where these are processed, Rome Synthinol 901 offers valuable protection because of its exceptional oil resistance.

A manufacturer of transformers uses Rome Synthinol 901 as original equipment, for coil leads. It does not contaminate the transformer oil, even though it's immersed in the oil over extended periods at continuous operating temperatures of 90° C. (or higher).

Unequaled performance . . .

For 600-volt service under extreme conditions of heat, moisture, corrosive fumes, oil or chemical corrosion, or combinations of all these, Rome Synthinol 901 outperforms comparable wiring material—rubber and polychloroprene compounds, and many of the other commonly used thermoplastics now on the market.

In this one wiring material, plant electrical engineers, industrial contractors, or original equipment manufacturers can get characteristics unequalled in any other wire.

Strong claims? You can prove them for yourself by testing Rome Synthinol 901 in your own plant or laboratory. It's made for conditions that are death to ordinary electrical wiring.

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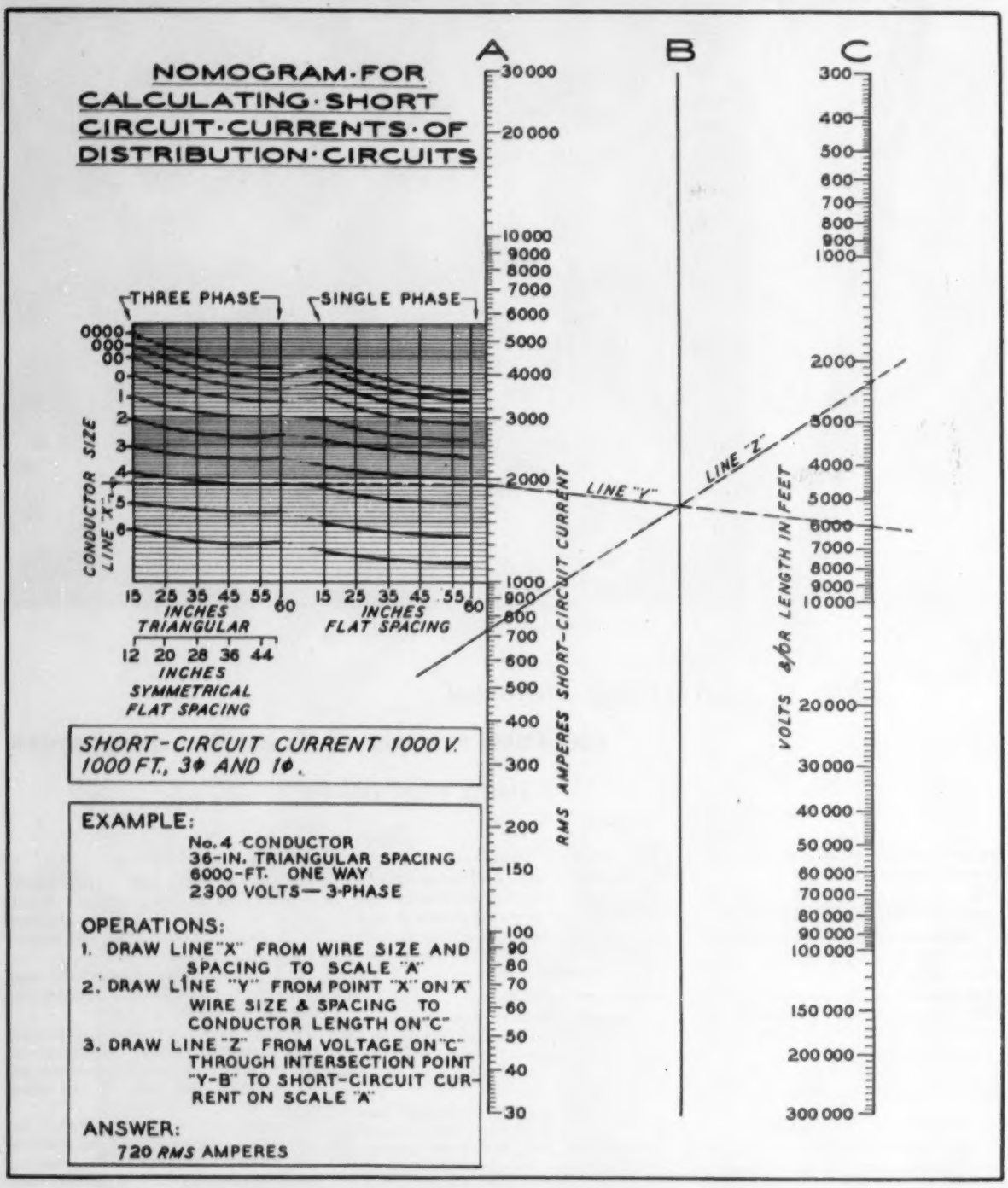

A nomogram for calculating short circuit currents of electric distribution circuits

by Ralph R. Taggs

This chart provides a simple, easily handled method of calculating short circuit currents for both single-phase and three-phase lines in a wide range of voltages and conductor sizes. Both triangular and symmetrical flat spacing of three-phase conductors is provided. Chart may be entered at wire size and spacing; then for a given distance and voltage, the short circuit current may be read from Scale A.

270-Foot Sno-Freighter Ferries
150-Ton Cargoes Overland in Arctic Winter

24 Electric Wheel Motors Run by Cold-Resisting SIMPLEX CABLES

This giant six-section cargo carrier supplies isolated military radar stations along the Arctic Coast.

Built by R. G. LeTourneau, Inc. for Alaska Freight Lines, the Sno-Freighter travels over ice, compacted snow, bulldozed trails and rough terrain. It runs on tubeless tires that are seven feet high and three feet wide.

Each wheel is a package power unit with a DC electric motor and gear reduction unit built into the rim. Flexible neoprene-covered Simplex Cables designed for −50°F. temperatures carry electrical power from engine generating sets to the wheel motors.

All equipment to a height of six feet, including the Simplex Cables, are waterproof so the Sno-Freighter can ford streams.

If you have an electrical cable problem that involves extreme temperature or moisture conditions, why not write to the address below.

Simplex

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.

6 POWERFUL REASONS WHY THOUSANDS ARE SWITCHING TO...

Plymouth PLASTIC *Electrical* TAPE

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PLYMOUTH RUBBER COMPANY, INC.

Manufacturers of SLIPKNOT — The World's Largest Selling Friction Tape

Canton, Mass.

New, shallower design fits smallest single-gang box

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3-WIRE

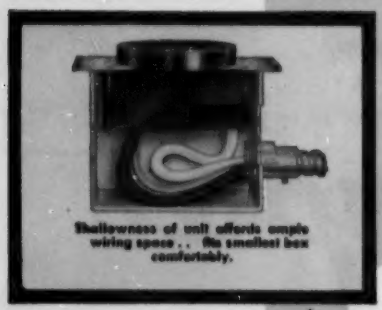
SURFACE-TYPE

POWER OUTLET

30 Amp., 250 V, Grounded and Ungrounded

Compact size and unusually shallow depth permits mounting in a minimum size box with no interference at side or base. Ample room is allowed for wires. Exclusive Hubbell pressure plate back wiring speeds installation and assures a safe, pull-proof connection.

- Shallow depth, compact, fits minimum size box.
- Pressure plate back wiring for faster and safer installation.
- Captive binding screws can't contact sides of box.
- 3-hole mounting plate permits mounting flexibility.
- Pressure terminals cadmium plated to permit use of aluminum building wire.
- Tough fibre back protects terminals.



Shallowness of unit affords ample wiring space . . fits smallest box comfortably.

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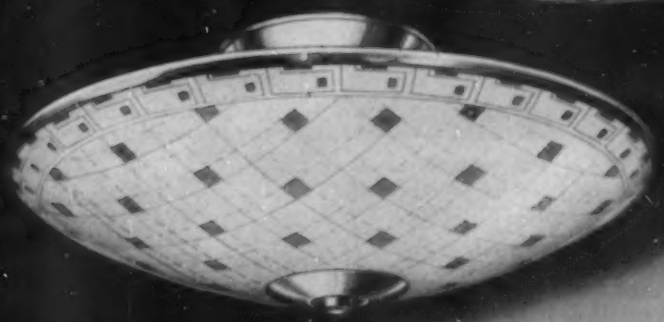
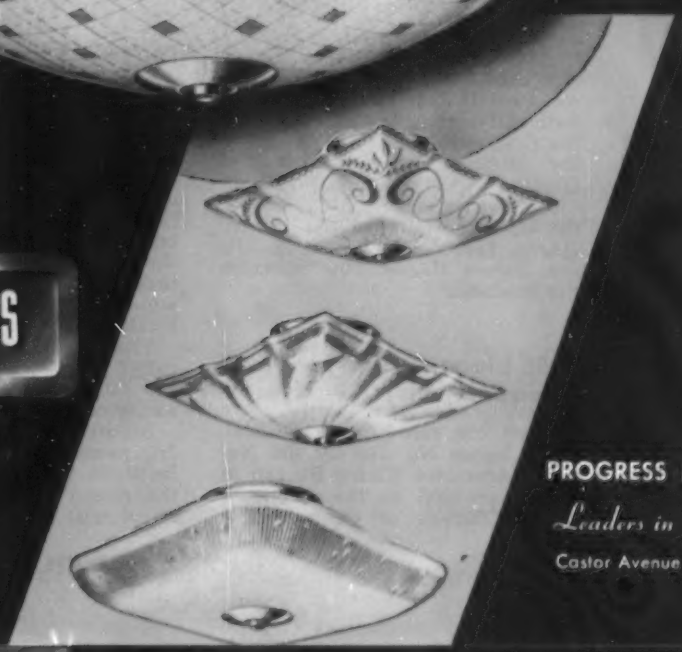
W I T H T H E

Golden touch



WITH THE SPARKLE OF GOLDEN BEADS AND A GLEAMING BRASS HALO FOR ADDED GLAMOUR



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PROGRESS MANUFACTURING CO., INC.

Leaders in Lighting for Half-a-Century

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News of the industry

edited for Southern readers

Vennard named EEI managing director

THE BOARD of directors of the Edison Electric Institute has elected Edwin Vennard vice-president and managing director to become effective upon the retirement of Col. Howard S. Bennion on June 1, 1956, it has been announced by Harllee Branch, Jr., president.

Mr. Vennard will join the Institute on or about March 1, 1956.

One of the most widely-known executives in the electric utility industry, Mr. Vennard has been president of the Middle West Service Co., Chicago, since 1953. As an executive of that company for nearly 20 years, he has been a leading consultant on public utility economics, new business, rates, and public and employee relations.

Before joining the Middle West organization, he worked for a year in the General Electric testing department, and later for Gulf States Utilities Co. He was general commercial manager in charge of sales and rates for Southwestern Gas & Electric Co., Shreveport, La., from 1927 to 1933.

Edwin Vennard

Prominent in trade association activities for many years, Mr. Vennard's services to the electric industry include the chairmanship of the Commercial Division of Edison Electric Institute in 1942-44, of the Modern Kitchen Bureau in 1942, and of the Sales Executives' Conference in 1950.

Mr. Vennard was born in New Orleans in 1902 and is an engineering graduate of Tulane University.

Members of the Edison Electric Institute, trade association of the electric light and power industry, include companies which provide electric service for more than 93 per cent of all customers served by the electric companies in the USA.

Atlanta Chapter, NECA honors Hunter Hogue

HUNTER HOGUE, long-time Atlanta electrical contractor, was made an honorary lifetime member of the Atlanta Chapter, National Electrical Contractors Association on Thursday, January 5, 1956. Presentation of a silver membership card was made by R. W. Allison, president, to Mr. Hogue on behalf of the Chapter. Mr. Hogue is the first member so honored since the organization was chartered locally in 1925.

Hunter Hogue was recently made an honorary lifetime member of the Atlanta Chapter, NECA.

Mr. Hogue, who is still active in the business, founded the Hunter Hogue Electric Co. in 1908. His son, James Hogue, now manages the business.

1955 biggest year for Adequate Wiring Bureau

WITH THE ISSUING of Certification License No. 100 by the National Adequate Wiring Bureau in December 1955 to the Adequate Wiring Bureau of Central New York, Bureau activities in the new home wiring field reached the climax of its year of greatest activity. During 1955, the number of home wiring certification agencies licensed by the national bureau was the greatest in its history.

Twenty-six bureaus were licensed during 1955. During the ten-year period which preceded this record increase (January 1945 to December 31, 1954) the growth of the certification program throughout the country was slow but steady, encompassing more and more areas. At present, certified adequate wiring is available to new homes which qualify, in areas representing nearly 50% of the country's residential meters.

Utilities launch industry promotion

SOME 70 individual electric utility companies launched a broad industry movement aimed at increasing the residential use of electricity when they staged simultaneous meetings recently in more than 80 cities across the country.

Highlight of each meeting was a closed circuit telecast with TV personality John Daly as master of ceremonies.

The movement, built around the theme, "Live Better . . . Electrically," is designed to stimulate participation by manufacturers, home builders, contractors, architects, electrical distributors, dealers, realtors and lending institutions in selling the benefits of increased electrification to the American home owner.

An estimated 35,000 such businessmen attended the kick-off meetings at which the special TV show served to dramatize the opportunities for accelerated marketing of electrical goods and services in residential areas and the benefits to be derived. Following the telecast, they heard executives of the individual utilities outline their own plans of action and were invited by them to participate locally in the long range project.

The "Live Better . . . Electrically" promotion will function at the direction of each sponsoring utility company in its own area.

According to Harllee Branch, Jr., president of Edison Electric Institute, who also will appear on the closed show, the coordinated effort will involve intensive local

He's coming to help you

He is a Bell System communications engineer. His purpose is to help you speed your operations, cut your costs and improve your service—by making sure your communications meet your exact requirements.

The Bell System offers a wide variety of private line services, including telephone, teletypewriter and mobile radio systems. And the Bell System tailors these facilities to meet specific individual needs, so that you maintain high-speed contact between your various departments, branches, factories, warehouses, as well as between you and your suppliers, customers, distributors and shippers.

Why not let a Bell System communications engineer make a study of your communications requirements and recommend the kind of service, or a combination of services, which will best meet your specific needs?

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His survey is free and his recommendations are yours without obligation. You can reach him by calling your nearest Bell Telephone business office.

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activities against a background of national promotion including trade and consumer advertising.

The industry spokesman stressed his belief that success of the overall program would hinge largely on the extent of local cooperative action by utilities and their trade associates.

In discussing the timeliness of the movement, Mr. Branch noted that the "size and stability of the residential electrical market, coupled with expanding home construction and modernization required by our steadily increasing population, indicate the need for an integrated approach toward mass market development by the whole industry."

REA estimates 93.4% farms electrified

ABOUT 93.4 PERCENT of the nation's 4,782,393 farms had central station electric service as of June 30, 1955, the U. S. Department of Agriculture has announced. This compares with 92.3 percent having service on June 30, 1954 and 77.2 percent at the time of the 1950 census.

The new estimate is based on the Rural Electrification Administration's latest unelectrified farm survey and on 1954 farm census figures recently announced by the Bureau of the Census. The REA survey shows that there were 314,350 unelectrified farms on June 30, 1955. On the basis of the total number of farms shown in the 1954 census, this indicates that 4,468,043 farms were receiving central station service as of that date.

The census reported that there were 4,448,462 electrified farms as of November 1954. However, census figures include farms with home plants, while REA is required to consider as electrified only those farms having central station service.

More than 4 million farms have obtained central station electricity since 1920 and of these nearly 3¾ million have obtained service since 1935, when REA was established. In 1935 only 10.9 percent of the farms had highline electric service; in 1940, 30.4 percent; and in 1945, 45.7 percent. In addition, electric service has been extended to many hundreds of thousands of rural establishments which have passed out of the farm category as the total number of farms has decreased.

IES celebrates 50th anniversary

THE 50TH Anniversary of the Illuminating Engineering Society was marked by the Georgia Section with an anniversary party which honored the past chairmen of the organization.

The program included a short history of the Society presented by J. Dixon Mitchell, Southern regional vice-president of IES. He was followed on the program by C. M. Wallace, vice-president of Georgia Power Company, who told something of the history of the Atlanta Lighting Club.

Jack Murrah, also of Georgia Power Company, reviewed the activities of the Georgia Section under each of its past chairmen.

A special feature of the meeting was the cutting of the IES birthday cake. This privilege went to T. Taylor Peake, honored by the Section as its most valuable and active member since the Section was organized in 1939.

Every past chairman of the

Taylor Peake, right, cuts the IES Golden Anniversary cake. With him is Judd Lough, Georgia Section chairman.

On hand for the Georgia Section, IES 50th Anniversary party were all 23 past chairmen of the Georgia Section and its associated group, Atlanta Lighting Forum. At extreme left is Judd Lough, present chairman; at extreme right is J. Dixon Mitchell, regional vice-president of IES.

Georgia Section and its associated group, Atlanta Residential Lighting Forum, was on hand for the meeting. The Georgia Section past chairmen, in chronological order, are Charles H. Burch, Ivar H. Stockel, James F. Whitehead, Jr., Hamilton Corey, Henry F. Barksdale, Walter F. Nelson, A. E. Bruner, Joe B. Browder, Orin M. Ruff, Jr., Cecil Cannon, Jack Murrah, H. M. Horton, Taylor Peake, J. Dixon Mitchell, Johnnie Sweatte, Paul P. Harrison, and Judd Lough.

Past chairmen of the Residential Lighting Forum are Ruth Morris, Emily Alexander, Fern Moran, Nine Faye Bonner, Judd Lough, Mary Bush, and Elizabeth Parker.

Reed elected president of New Orleans group

C. ESPY REED has been elected president of the Electrical Association of New Orleans for 1956. He succeeds W. A. Barnes.

Other officers elected were A. B. Paterson, Jr., executive vice-president; J. D. Tillman, vice-president, Wholesalers, Utilities, Manufacturers; J. B. Habans, vice-president, Appliances; J. M. Nunez, vice-president, Electrical Contractors; O. E. Barron, Jr., vice-president, Air Conditioning and Ventilation; Matt Ballatin, vice-president, Radio & Television; W. E. Clement, director of publicity; E. H. Mowen, secretary; and A. M. Brewer, treasurer.

The Executive Committee elected for 1956 is composed of Wes P. Massey, Ned Breitenmoser, J. M. Wyatt, C. W. Flach, G. J. Putnam, Chester Flick, E. N. Avegno, Arthur Wachter, T. R. Magee, and W. A. Barnes, ex-officio.

C. Espy Reed, right, is 1956 president of the Electrical Association of New Orleans, succeeding W. A. Barnes, left.

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NON-METALLIC SHEATHED CABLE

● Diamond DTX is *really* white! Non-sticking, smooth and easy to pull.

- Walls stay clean!
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For a fast, clean installation . . . get DIAMOND DTX!

Write today for Catalog and Samples.

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SYCAMORE, ILLINOIS

Revised fan standards issued by NEMA

A REVISED EDITION of NEMA Standards for Electric Fans has been announced by the Electric Fan Section of the National Electrical Manufacturers Association, representing 17 companies manufacturing household electric fans.

This publication covers the recommended ways of testing and rating the different types of fans, in order to avoid error and confusion in the information published. This new manual, Standards for Electric Fans, FM1-1955, further describes each of the various types of fans to be found in general use in homes, offices, etc., including desk fans, pedestal and circulator types, hassock fans and ventilating and exhaust fans.

The standards covered in this manual should help the prospective purchaser of an electric fan to measure and distinguish between the performance of fans for general use and those for ventilation purposes only. These standards stress the difference between "circulating" or "free air" fans and those used for ventilating or exhaust purposes. This is so often the least understood element of operation and testing procedure.

The manual especially cautions against using incorrect tests and against mis-stating the air flow by giving the circulating test value instead of the ventilating or exhaust value for one of the latter types of fan—since the circulating flow of air is greater than for the ventilating or exhaust flow.

Manufacturers, dealers and purchasers of fans will find this information useful, and through its use, much of the confusion which now exists about fans and their performance will be eliminated.

Information about this new manual may be obtained from the Electric Fan Section, National Electrical Manufacturers Association, 155 East 44th Street, New York 17, N. Y.

Graybar announces new Lexington office

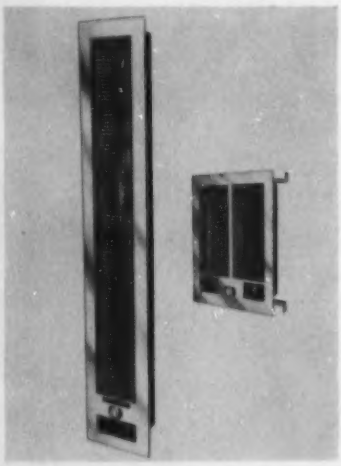
ANNOUNCEMENT of the opening of a new Graybar Electric Company office and warehouse at Lexington, Ky., has been made by G. L. Call, Ohio Valley district manager. The new office at 745 East Third Street will stock the products of 300 leading electrical manufacturers, including a complete line of major appliances.

Lester Samples is the supervisor of the Lexington location. He has been with Graybar since 1952 when he started as an office salesman at Dayton, Ohio. Since April, 1955 he has been working in the Dayton territory as an appliance salesman. Assisting Mr. Samples is Lawrence Wester who has been associated with the electrical industry for many years.

Other members of the Graybar-Lexington organization include J. C. Adams, E. A. Shelton, W. H. Farmer, and D. C. Stamer. Both Mr. Adams and Mr. Farmer have been residents of Lexington for many years and have been serving the Lexington area as Graybar representatives.

Space heater field entered by Trade-Wind

ANOTHER MANUFACTURER has entered the electrical space heating field. Trade-Wind Motorfans, Inc., a leading producer of kitchen and small room ventilators, has announced a line of radiant wall insert heaters. The new heaters have been designed to combine both radiant and convection heating. A multi-louvered grille gives unobstructed radiant heating and, at the same time, accelerates convection heating.



Trade-Wind's new line of electric space heating units include the two models shown here.

Other features of the Trade-Wind heaters include an entirely new simplified mounting bar assembly which makes installation and alignment quick and easy and eliminates headers. Separate top and bottom mounting bars are located and nailed between the joists. The heater housing rides on these bars for horizontal positioning. The bars also provide the correct distance for either plaster or dry wall construction. The housing itself snaps into place by means of spring buttons.

The Trade-Wind line includes two sizes, 45" high by 6¾" wide and 15" high by 10¼" wide, which are available with built-in thermostat or with "on-off" switch control. Wattage ranges from 1300 to 1650 using 115 volts A.C. A large model drawing 2000 watts operates on 220 volts A.C.

Trade-Wind Heaters will be distributed through the channels which handle the Trade-Wind ventilating equipment. For additional information write the manufacturer Trade-Wind Motorfans, Inc., 7755 Paramount Blvd., Rivera, California.

General Control names Woodman representative

B. S. WOODMAN, Inc. has been appointed representative for General Control Company products in the states of Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee.

The main office of B. S. Woodman, Inc., is at 1570 Northside Dr., Atlanta 1, Ga. Other offices are in Charlotte, N. C., Birmingham, Ala., Columbia, S. C., Nashville, Tenn., and Tampa, Fla.

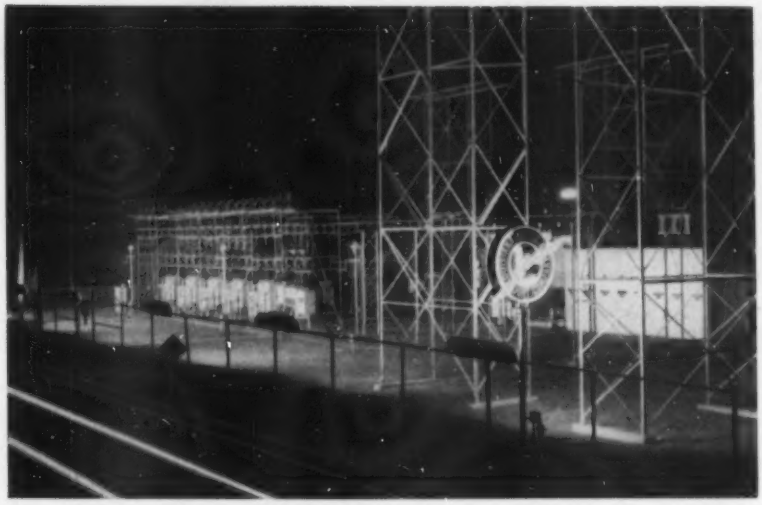
General Control Company manufactures lever switches, push button switches, foot switches, limit switches, electronic and synchronous motor timers, and "application-engineered" control panels.

EEI begins campaign for adequate wiring

A NATIONAL CONSUMER publicity program on wiring will begin in the spring of 1956, O. R. Doerr, chairman of Edison Electric Institute's Commercial Division Executive Committee, has announced. The promotional activity will center around the term "Housepower," a word coined to express meaning and implication of a fuller life in a better home through electrical adequacy.

The program is designed to complement existing wiring programs both national and local and will provide a rallying point for the entire electric industry to attack the wiring bottleneck which exists in at least 20 percent of today's homes.

Mr. Doerr stated that this will be an activity of the EEI Wiring Promotion Committee under the chairmanship of E. O. George, general sales manager of the Detroit Edison Co. Complete details of the proposed program will be made known in the near future.



SUBSTATION LIGHTING—Six two-lamp fluorescent luminaires have been installed by Louisiana Power and Light Co., in one of its substations for operating convenience and attractive display of company property. The units are attached to the fence structure. Light is maintained within the station area, and by slight tilting of the units, is provided to the top of the structure also.

Utilities participate in heat pump survey

"HEAT PUMP Promotional Activities," a 1955 EEI heat pump survey in which 129 electric companies participated, has just been compiled by the Edison Electric Institute.

The survey, carried out under the direction of the Market Research Committee and the Commercial Electric Space Heating and Air Conditioning Committee of EEI and the joint AEIC-EEI Heat Pump Committee, contains information concerning promotional activities of three groups of utilities. The groups are those with definite programs, companies who plan to promote the heat pump in the future but have no present definite program, and a group whose activities are primarily concerned only with experimental installations for company study purposes.

Forty-six utilities reported definite promotional programs, sixteen indicated they plan to promote the heat pump, and six companies plan to carry out investigations with experimental installations before making definite programs.

Installations reported by the 129 companies surveyed, as of December 31, 1954, included 1,614 residential, 991 commercial and 17 industrial, for a total of 2,622.

A geographical distribution of the number of residential and commercial heat pump installations was recorded. The South Atlantic section led with 1,240 installations reported. Next was the Pacific region showing 510. Other sections were West South Central, 345; East South Central, 213; East North Central, 147; Middle Atlantic, 58; Mountain, 56; West North Central, 35 and New England, 1.

The survey shows that as a heat source 1,251 installations used air, 862 water and 71 ground. Not all of the companies reported their heat source however.

The survey was intended to determine how many electric power "customers" are using heat pumps, so the number of installations are of primary interest. The term "installation" as used in the report means a customer and not units, there can be more than one heat pump at an installation.

Sales quotas for 1955 were reported in various ways. A total of 480 heat pump installations are planned by ten companies while five other companies reported 542 "units." Two companies plan to install 3,377 "tons" during 1955.

Tull Metal & Supply Co. purchases Florida Metals

THE J. M. Tull Metal and Supply Company, Inc., of Atlanta, Ga., has purchased controlling interest in the Florida Metals, Inc., a corporation whose principal office is in Tampa, with offices and warehouse facilities in Miami and Jacksonville.

The acquisition of Florida Metals, Inc., by J. M. Tull Metal and Supply Co. will enable these two companies to give more complete service to the fast-growing industrial development now taking place in the Southeast.

Florida Metals, Inc. was organized in 1946 in Tampa, and for a time dealt primarily in aluminum products. More recently it has expanded by establishing warehouses in Miami and Jacksonville, and has broadened its line of products to include all non-ferrous metals and accessories with the exception of nickel products.

New trade council to represent industry

A NON-PROFIT incorporated business league called the Council of Mechanical Specialty Contracting Industries, Inc. was organized in Washington, D. C., recently. The league represents the joint interests of the mechanical specialty contracting industries which include the electrical, heating, plumbing, piping, air conditioning, refrigerating and ventilating branches.

Involved are approximately 87,000 small independent businesses employing approximately 500,000 of the highest skilled mechanics in the building trades. Together, they account for approximately half of the total dollar volume in new buildings and last year they performed more than $25 billion in services on new construction.

The Council promptly took over the activities that for the past five years have been conducted on an informal basis by the Liaison Committee of the Mechanical Specialty Contracting Industries. Unlike the Liaison Committee, the Council is a direct membership association. The Liaison Committee was a loose federation of trade associations operating in the field. Trade associations have an important role in the Council but its organization is much broader than traditional trade association lines.

First objective of the Council set by the board of trustees was to drive for enactment of the Federal Construction Contract Act (S. 1644) in the 84th Congress which convened in Washington in January. Passed by the Senate last year, this bill is pending in the House Judiciary Committee.

Scope of the Council, however, goes much further than just legislative interest. The bylaws and articles of incorporation state the objectives as follows:

"To represent, promote and advance the common interests of the mechanical specialty contracting industry; to promote the adoption of improved contracting forms,

practices and procedures by all persons and organizations purchasing construction services in the interest of the entire construction industry, including the suppliers of construction materials, and of the purchasers of construction; to coordinate the efforts and interests of the several branches of the mechanical contracting industry in improved contracting forms, practices and procedures; and to serve as a liaison between national trade associations in the mechanical specialty contracting industry."

A subject high on the agenda of the Council is aggressive action to cause a more equitable policy on retained percentages. The suggested procedure on retained percentages proposed by an all-industry study of the subject is being studied by the Council. Other subjects of interest to the Council are relations with architects and engineers, bid deadlines and better specification writing.

James S. Binder, president of Pfeifer Plumbing and Heating Co., Inc., Little Rock, Ark., was elected president of the board of trustees of the Council at the organizational meeting. Fred Williams of Fred Williams, Inc., Boston, was elected vice-president. Other members of the board of trustees are Walter F. Limbach, Limbach Co., Pittsburgh; Paul M. Geary, executive vice-president of the National Electrical

Dates Ahead

International Association of Electrical Inspectors, Mississippi Chapter, Annual Meeting, Edwards Hotel, Jackson, Miss., Feb. 20-21, 1956.

Edison Electric Institute, Meter and Service Committee, Hotel Cleveland, Cleveland, Ohio. Feb. 20-22, 1956.

12th Annual National Adequate Wiring Conference, LaSalle Hotel, Chicago, Ill., Feb. 23-24, 1956.

Southern Textile Conference, AIEE, Georgia Institute of Technology, Atlanta, Ga., March 1-2, 1956.

Southern Safety Conference and Exposition, Biltmore Hotel, Atlanta, Ga., March 4-6, 1956. W. L. Groth, exec. Dir., P. O. Box 8927, Richmond 25, Va.

Paper and Pulp Conference, AIEE, University of Florida, Gainesville, Fla. March 8-9, 1956.

Southeastern Electric Exchange, Annual Meeting, Boca Raton Hotel and Club, Boca Raton, Fla. March 12-14, 1956.

National Electrical Manufacturer Association, Edgewater Beach Hotel, Chicago, Ill., March 12-16, 1956.

Oklahoma Utilities Association, Annual Convention, Oklahoma City, Okla., March 22-23, 1956.

Edison Electric Institute, 22nd Annual Sales Conference, Edgewater Beach Hotel, Chicago, Ill., March 26-29, 1956.

American Institute of Electrical Engineers, Southwest District Meeting, Dallas, Texas, April 2-4, 1956.

Illuminating Engineering Society, Southern Regional Conference, Birmingham, Ala., April 5-7, 1956.

International Association of Electrical Inspectors, Florida Chapter, Annual Meeting, San Carlos Hotel, Pensacola, Fla., April 6-7, 1956.

Illuminating Engineering Society, Southwestern Regional Conference, Hilton Hotel, Ft. Worth, Texas, April 8-10, 1956.

International Association of Electrical Inspectors, North Carolina Chapter, Annual Meeting, Carolina Hotel, Raleigh, N. C., April 10-11, 1956.

Southeastern Electric Exchange, Engineering and Operation Section, Bon Air Hotel, Augusta, Ga., April 12-13, 1956.

International Association of Electrical Inspectors, South Carolina Chapter, Annual Meeting, Columbia Hotel, Columbia, S. C., April 16-17, 1956.

International Association of Electrical Inspectors, Alabama Chapter, Annual Meeting, Whitley Hotel, Montgomery, Ala., April 19-20, 1956.

International Association of Electrical Inspectors, Georgia Chapter, Annual Meeting, Ware Hotel, Waycross, Ga., April 23-24, 1956.

Ninth Annual Conference for Protective Relay Engineers, A & M College of Texas, College Station, Texas, April 23-25, 1956.

International Association of Electrical Inspectors, Joint Four Chapters — George Welman, North Louisiana - East Texas, Texas, & Texas Gulf Coast — Annual Meeting, Alexandria, La., May 4-5, 1956.

National Electrical Contractors Assn., Third District Convention, Fort Sumter Hotel, Charleston, S. C., May 10-12, 1956.

National Industrial Service Association, Inc., Bellevue Stratford Hotel, Philadelphia, Pa., May 13-17, 1956.

Edison Electric Institute, 24th Annual Convention, Atlantic City, N. J., June 4-7, 1956.

National Association of Electrical Distributors, 48th Annual Convention, Ambassador-Chelsea Hotels, Atlantic City, N. J., June 10-16, 1956.

Virginia Chapter, IAEI, Annual Meeting, Hotel Roanoke, Roanoke, Va., June 25-26, 1956.

American Institute of Electrical Engineers, Summer and Pacific General Meeting, San Francisco, Calif., June 25-29, 1956.

Public Utilities Assn. of the Virginias, 38th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., Sept. 13-15, 1956.

Maryland Utilities Assn., 32nd Fall Conference, Cavalier Hotel, Virginia Beach, Va., Sept. 14-15, 1956.

National Electrical Contractors Assn., Annual Convention and 2nd National Exposition, Sheraton - Palace Hotel, San Francisco, Calif., Sept. 23-29, 1956.

American Institute of Electrical Engineers, Fall General Meeting, Morrison Hotel, Chicago, Ill., Oct. 1-5, 1956.

Southeastern Electric Exchange, Sales Section Annual Conference, Tides Hotel, St. Petersburg, Fla., Oct. 4-5, 1956.

Southeastern Electric Exchange, Accounting Section Conference, Miami Beach, Fla., Oct. 11-12, 1956.

International Association of Electrical Inspectors, Southern Section, Annual Meeting, Conrad Hilton Hotel, Dallas, Tex., October 22-24, 1956.

There IS a Difference!

Connectors may look alike but it's PERFORMANCE that counts

BLACKBURN CONNECTORS OUT-PERFORM THEM ALL

Because They Are . . .

BETTER MECHANICALLY

- Made of high strength duronze, a silicon bronze alloy stronger than structural steel.
- Machine cut threads, *CFC treated, provides more thread engagement —reduces friction and increases thread efficiency. *Chemical Friction Control.
- Rigid inspection of each production operation assures uniformly good connectors.

BETTER ELECTRICALLY

- High clamping force—the result of greater thread efficiency breaks down oxide on the conductor improving conductivity.
- Higher initial conductivity, actually greater than an equal length of conductor is maintained permanently.

REUSABLE

- Selection of proper high-strength, corrosion-resistant materials—plus precision workmanship and inspection—means Blackburn connectors may be used over and over.

BLACKBURN *Hi-Strength* CONNECTORS

AVAILABLE AT ELECTRICAL WHOLESALERS EVERYWHERE

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Contractors Assoc., Washington, D. C., and Henry H. Glassie, Weaver & Glassie, Washington, D. C. George B. Roscoe, secretary of the Liaison Committee and director of public relations of the National Electrical Contractors Assoc., was appointed executive secretary for a two-year term.

Moe light to unveil unusual display

ONE OF THE most outstanding displays ever seen at the N.A.H.B. Show will be unveiled by Moe Light Division of Thomas Industries Inc. at Booth 445 in the Hotel Sherman this month. The unusual display will be animated, and will feature eight individual room settings showing builder examples of Moe Light, Inspiration Lighting in various room settings.

The display will be 20 feet wide, 8 feet high, and 8 feet deep. The animation consists of eight moving dollies on a track, each carrying a recessed room area about 45 inches by 20 inches. Each of the eight room areas will be decorated to resemble an actual room setting; i.e., dining area, dining room, living room, bedroom, recreation room, bathroom, kitchen and outdoor entrance.

New name for Viking

VIKING AIR PRODUCTS is the new name of Viking Air Conditioning, a division of National-U. S. Radiator Corp. The new name more accurately describes its manufactured line, which includes furnace blowers, blower packages, duct blowers, blower wheels, furnace and duct humidifiers, attic fans, and window and circulating fans. The Viking factory is located in Cleveland, Ohio.

Vast underground system announced for Wheeling

THE WHEELING ELECTRIC CO. has announced that it will construct an underground electric distribution system in the Wheeling business district at an estimated cost of $1,800,000.

R. R. Jewell, vice-president and general manager of Wheeling Electric, said "We are particularly pleased to be able to make this announcement because we know that this project is one that is close to the hearts of all the citizens of Wheeling."

In most of the Wheeling business district all overhead lines will be removed and placed in underground conduits. New street light standards also will be installed on several streets. The work will involve the installation of about 200,000 ft. of conduit, 150,000 ft. of electric conductors for the distribution network and 36,000 ft. of street light cable.

Fisher-Pierce appoints new representative

EFFECTIVE IMMEDIATELY, The Fisher-Pierce Co., Inc., manufacturers of photoelectric lighting controls, will be represented in the St. Louis - Kansas City area by Williams & McKinley Sales Co. A. V. Williams and P. H. McKinley, of the Baltimore Building office in Kansas City, and R. H. Harper of 104 West Glenwood, Kirkwood, Mo., are the individual representatives.

Officers and convention announced for 1956

OKLAHOMA UTILITIES ASSOCIATION has announced annual convention dates and elected new officers and directors for 1956, according to Miss Kate A. Niblack, secretary.

The 1956 annual convention will be held March 22-23 at the Biltmore Hotel, Oklahoma City.

Newly elected president of Oklahoma Utilities Association is H. C. Webb, vice-president of Oklahoma Natural Gas Co. Other officers are H. P. Hoheisel, first vice-president; Dale E. Frieden, second vice-president; and H. H. Ferrin, treasurer.

Westinghouse constructs warehouse addition

CONSTRUCTION IS UNDERWAY for a new warehouse addition to the Richmond, Ky., Lamp Division plant of the Westinghouse Electric Corp., F. M. Sloan, division general manager, has announced.

The 16,500 square-foot addition will be built onto the rear of the seven-year-old plant, and will increase available floor space to 91,500 square feet. The new addition will be used to store raw materials and finished lamps, and will make more room available for production.

Contractor for the construction work is the Hargett Construction Company of Lexington, Ky. Staggs and Fisher, consulting engineers of Lexington, designed the new addition. The construction is scheduled for completion in May, 1956.

New representatives appointed by Sunwarm

SUNWARM, INC., of Kingsport, Tenn., manufacturer of ceiling heating cable and electrical wall heaters, has appointed Marvin Black, 407 12th Street, Lake Wales, Fla., as its exclusive representative in the state of Florida; and James B. Richardson, 439 Deerwood Drive, Columbia, S. C., as its exclusive representative in South Carolina and southern North Carolina.

Ramond named Slater Delta representative

A NEW REPRESENTATIVE has been announced for Slater Electric & Mfg. Co., Inc., of Woodside, N. Y., manufacturers of lifetime wiring devices. Charles K. Ramond & Co., 1021 Carondelet Bldg., New Orleans 12, La., will cover the southern half of Mississippi, the state of Louisiana, and the cities of Mobile, Ala., and Pensacola, Fla., for Slater.

G-E plant at Rome, Ga. becomes new department

FORMATION of a new manufacturing department of the General Electric Co., the Medium Transformer Department, with headquarters at Rome, Ga., has been announced by William S. Ginn, general manager of the company's Transformer Division.

Effective Jan. 1, the Rome plant of the Power Transformer Department became a separate product department, responsible for its own engineering, manufacturing and marketing.

The $25 million plant was opened in 1954 and now employs about 1,200 persons in the manufacture of medium-size power transformers; units rated from 501 to 5,000 kilovolt-amperes, single phase, and 501 to 10,000 kva, three-phase, 69 kilovolts and below.

David B. Lawton, plant manager since ground was broken for the Rome factory in 1952, will become general manager of the new department.

The reorganization is another step in the company's decentralization program, Ginn explained. When a product line outgrows the organization in which it has developed, a separate department is formed to handle it.

Production of standard types of medium power transformers by assembly line methods has been highly successful at the ultra-modern Rome plant, said Ginn.

Engineer conference set for Texas A & M

THE NINTH ANNUAL Conference for Protective Relay Engineers, held at A & M College of Texas, College Station, Texas, has been set for April 23-25, 1956, according to announcement made by L. M. Haupt, conference chairman.

Brief news notes of manufacturers

IMPERIAL Lighting Products Co. are now building an addition to their new factory in Latrobe, Pa. The addition will add approximately one-third more floor space.

* * *

CLYDE E. MIMS & Associates, Myrtle Beach, S. C., announce the opening of a warehouse in Charlotte, N. C., at 3401 Spencer St.

* * *

COMPLETION of two new buildings, located adjacent to their main factory, by Berns Manufacturing Corp., Chicago, has added an additional 25,000 sq. ft. of space to their present facilities.

According to Gilbert Meyers, sales manager, the additions were made necessary by the greatly increased sales volume enjoyed by Berns during the past few years and the extremely favorable reception accorded the recent introduction of their line of ventilation kitchen range hoods.

* * *

PRECISION Transformer Corporation announces the removal of all office and plant operations to their convenient new location, 2218 West Lake St., Chicago, Ill.

This increase in space will facilitate up to four times the previous production capacity, permitting complete expansion of their line of air-cooled and liquid-filled transformers for every power and lighting distribution need.

* * *

PHILIP KERRIGAN, Jr., president of Kerrigan Iron Works, Inc., Nashville, Tenn., has announced expansion plans for their main offices. Contract has been let and construction is well under way for a two-story, fireproof, brick addition, in the classic Greek design. Kennon Construction Company is general contractor and Robert H. Street the architect.

This new building was made necessary to provide space for their new Greulich Bridge Flooring Division and expansion in the Street Light Standard Division.

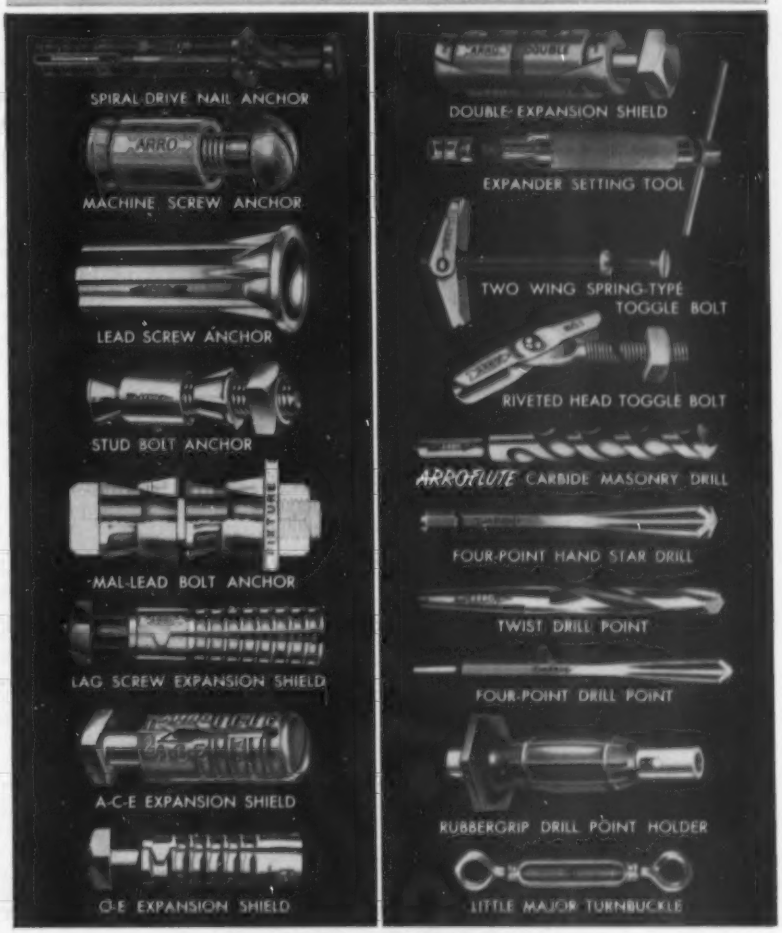
Your Nearest Distributor

is your best stockroom

By always having Arro Anchoring and Drilling Devices on hand, your nearest industrial supplier, wholesale hardware, or electrical supply house can enable you to keep production up, while keeping your inventory costs down.

Always Specify TRADE ARRO MARK

COMPLETE LINE
ANCHORING AND DRILLING DEVICES FOR ALL MASONRY



TRADE ARRO MARK

See your industrial, hardware or electrical supplier

ARRO EXPANSION BOLT COMPANY

1520 Boone Ave., Marion, Ohio

News about people

Herbert E. Barth has been named to the newly created position of executive vice-president of **American Blower Corp.**, **John C. Linsenmeyer**, president, has announced.

H. E. Barth

At the same time, **Edwin W. Petersen** was appointed vice-president, Sales, succeeding Mr. Barth. Mr. Petersen formerly was sales manager.

E. W. Petersen

Mr. Linsenmeyer also announced two executive appointments for **Canadian Sirocco Co., Ltd.**, a subsidiary of American Blower. **Clarence W. Johnson**, presently vice-president and general manager of Canadian Sirocco, will become president of the Canadian company. **Richard R. Noyes**, now sales manager, will become vice-president, Sales.

Mr. Barth joined American Blower as an engineer in 1915 following graduation from the University of Kentucky. He entered sales work for the Company in 1916, becoming vice-president, Sales, in 1937.

Mr. Petersen joined American Blower as a sales engineer in 1923 following graduation from Iowa State. He served in various sales and management positions before his appointment as sales manager in 1952.

Jack Gilbert Holtzclaw, president of the **Virginia Electric and Power Co.** for the past 26 years, died unexpectedly December 13 of a heart attack in a Richmond hospital.

The 69-year-old utility president had entered the hospital for a physical check-up after experiencing fatigue upon return from a board of directors meeting in New York.

Under his leadership Vepco has played a major part in the rural electrification and the overall electric service of Virginia, the eastern edge of West Virginia and northeastern North Carolina, and in the vast expansion of the company's generating facilities and transmission and distribution systems, totaling $346 million in the past eight years.

Edward D. Youmans, vice-president in charge of research and product development of **The Okonite Co.**, manufacturers of electrical wires and cables in Passaic and Paterson, N. J., died of a heart attack at his home on December 18. He was 58 years old.

Mr. Youmans joined the Okonite firm in 1913 as a laboratory assistant. He was named technical manager in 1928, made vice-president and technical director in 1943 and vice-president in charge of manufacturing and research in 1951. He was elected a director in 1952.

Born in Garnersville, N. Y., in 1897, he received his technical education at Brooklyn Polytechnic Institute. Throughout his career he had worked on the development of insulated wires and cables, particularly in adapting the synthetic rubber-like materials to these products. He took an active part in preparing standards for the National Electrical Manufacturers Association, the American Society for Testing Materials and the American Standards Association, having served as chairman of numerous committees of these organizations and with the National Electrical Code.

Arthur C. Westrom, chief engineer of **Hubbard and Co.**, Pittsburgh, Pa., has been appointed director of research and development. He succeeds **Charles L. Stroup**, who has been vice-president in charge of research. Mr. Stroup will continue to serve Hubbard in a consulting capacity.

Mr. Westrom joined Hubbard and Company in 1950 as an engineering specialist on protective devices for electrical distribution equipment. He was appointed chief engineer early last year. He has been responsible for many new pole line hardware developments and has been actively associated with the engineering program on the Hubbard autogap lightning arrester.

Joseph B. Fountain, chief engineer of the **Mississippi Power & Light Co.**, has been elected vice-president by the utility's board of directors, it has been announced by **Baxter Wilson**, president.

Mr. Fountain began his career with the utility as a student engineer at Vicksburg in 1928 after receiving the degree of Bachelor of Engineering from Mississippi State College.

J. B. Fountain

In his 27 years with the Mississippi Power & Light Co. he has held positions of increasing responsibility in the company's engineering section. When this section was established as a separate department in 1953, Mr. Fountain was appointed to head its operations.

As chief engineer, he was assigned the additional responsibility for electric power production and the supervision of the company's three generating stations at Natchez, Jackson, and Cleveland.

Appointment of **Noel C. Bride** to district lighting sales manager of the Washington, D. C., district by **Sylvania Electric Products Inc.**, has been announced by **Charles A. Burton**, general sales manager of Sylvania's

N. C. Bride

Lighting Division. He will make his headquarters at the company's offices at 2520 Oakville St., Alexandria, Va.

Mr. Bride succeeds **G. Dallas Rand,** who was recently appointed manager of government lighting sales by Sylvania.

Mr. Bride joined Sylvania in 1950 as retail sales representative in the Washington, D. C., district. He later became assistant to the retail sales manager and a field representative in that district. Last year, he was appointed assistant district sales manager of the Washington area.

Hopper & McCoy announces that **James K. Brokaw** has recently become associated with them, and will travel Tennessee, part of Alabama, and Georgia. Mr. Brokaw was

J. K. Brokaw

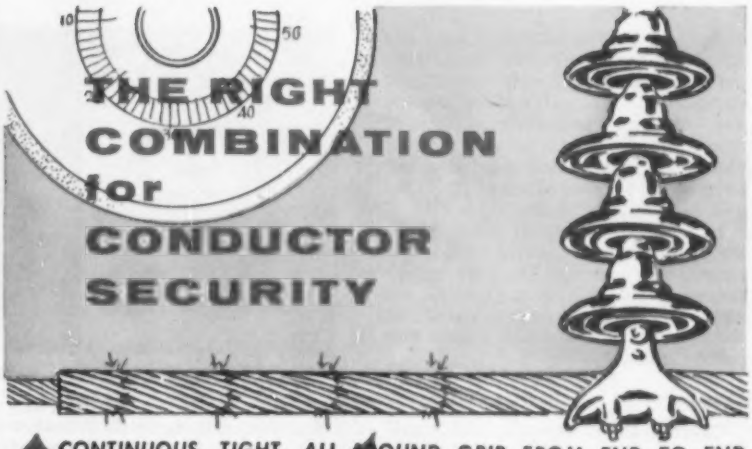
formerly sales manager for the Florida Electric Supply Co., and is acquainted with the electrical distributor's problems.

Jay Samuel Hartt, Chicago, was elected president of **Middle West Service Co.,** effective January 1, 1956. He succeeds **Edwin Vennard** who is resigning the presidency to become managing director of Edison Electric Institute, New York. Mr. Vennard will continue as a member of the Middle West executive committee and board of directors until March 1, when he joins EEI.

Mr. Hartt previously headed his own firm of consulting engineers which merged with Middle West Service Co. on December 31, 1954. Mr. Hartt has been chairman of the executive committee since the merger.

He is a graduate of Michigan State University with a B. S. in electrical engineering and has since received two awards for distinguished service from that university and an honorary degree of Doctor of Science from Northland College.

In his forty years of engineering practice Mr. Hartt and his organization have participated in more than 200 valuation and rate cases involving $8½ billions of property for electric, gas, transportation, telephone,



CONTINUOUS, TIGHT, ALL-AROUND GRIP FROM END TO END

the overhead conductor

fine FANNER superformed ARMOR RODS

UNIFORM FULL-LENGTH GRIP

Fanner Superformed armor rods contact conductor permanently and tightly *at every point* — not just at clamps.

COMPLETELY EFFECTIVE ARMORING

Exclusive, precision formed construction provides rugged, lasting protection for conductor.

DEPENDABLE PERFORMANCE

Every installation fits perfectly into place. Fanner precision design eliminates special skill on part of lineman.

RE-USABILITY

When reconductoring or line relocation demands it, Fanner Superformed Rods may be reapplied without rod waste or loss of armoring.

LOW INSTALLED COST

Fine Fanner Superformed Rods provide both initial and long term economy through low cost, easy application and multiple capabilities.

Licensed for use under Patent No. 2,275,019

THE FANNER MANUFACTURING CO.

Brookside Park • Established 1894 • Cleveland 9, Ohio

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ARMOR RODS • TAP ARMOR • LINEGUARDS • PATCH RODS

water and heating utilities. Under his direction, testimony has been prepared and presented before courts or commissions on valuations, income and expense projections, cost of money, rate of return, depreciation, design of rate schedules, customer usage analysis, and other engineering and economic subjects.

In addition to public utility work, Mr. Hartt has directed valuation studies on common carriers, manufacturing plants, coal mines, ice plants, buildings, sewer systems, oil wells, gasoline extraction plants and rolling mills.

R. G. Wheaten

E. W. Williams

W. D. Kyle

Charles D. Buchanan, vice-president and sales manager of **All Brite Fluorescent Fixtures** of California, announces the following staff promotions: **R. E. Liepold** has been appointed assistant to the vice-president; **Fred J. Bertoloni** has been appointed head of office sales, and **Marvin H. Ray,** chief of quotations.

Fluorescent Fixtures of California recently moved to their new 66,000 sq. ft. plant in South San Francisco. Tremendous increase in sales volume has forced the company to make a 40,000 sq. ft. addition to the facilities after only five months. Office and sales staff are being increased proportionately.

Election of **Rodgers G. Wheaton** as president of **Line Material Company** to succeed **William D. Kyle, Jr.,** who resigned, was announced today by **Max McGraw,** president, **McGraw Electric Co.,** Chicago.

At the same time, Mr. Wheaton announced the appointment of sales manager **Earle W. Williams** as vice-president in charge of marketing and sales, Wheaton's former position.

In making his resignation, Mr. Kyle announced his plans to enter the fibre pipe and conduit business.

Mr. Wheaton, who has been a vice-president since 1952, came with Line Material in 1933. He served successively as field engineer, ordnance engineer, division manager, manager of government contracts department and sales manager before becoming an officer of the company. He was born in Springfield, Mass., in 1902, attended the University of Maine for two years, graduated from the University of Idaho with a B.S. degree in 1924, then went on to Yale University, where he received a master's degree in 1925.

Mr. Williams joined Line Material in 1937 following his graduation from the State University of Iowa where he received a B. S. in electrical engineering. He started as a field engineer, then became assistant sales manager and sales manager at the firm's Kyle plant in South Milwaukee. He was later transferred to the headquarters office in Milwaukee to serve as sales promotion manager and finally sales manager.

Before coming to Line Material, Mr. Kyle was associated with Wisconsin Electric Power Co. for a year after graduating from Cornell University in 1936 with a B. S. degree in administration and electrical engineering. He was born in Milwaukee in 1915.

Appointment of **Channing B. Brown** as manager of the Industrial Power Dept., and **E. R. Davis** as assistant manager, has been announced by **Marshall E. Lake,** vice-president of **Duke Power Co.**

Appointed to the newly-created position of supervisor of stores was **M. A. Edwards,** who will direct system stores operations and have charge of the company's central warehouse now under construction on the outskirts of Charlotte.

The three men have already assumed their new duties.

Mr. Brown is a native of Charlottesville, Va., who joined Duke Power in 1922. He attended Davidson and Clemson Colleges and is a graduate of the University of Virginia.

Mr. Davis was born in Pittsburgh, Pa., and was graduated from the University of North Carolina. He joined Duke in 1931 and served in the company's Maintenance Dept. before being transferred to the Industrial Power Dept. in 1944.

IT'S HIGH TIME TO PREPARE FOR
A PEAK YEAR IN ATTIC FANS!

"BUFFALO" BREEZ-AIR ATTIC FANS set sales records every year—with all signs pointing to 1956 as the biggest yet! That's because home owners and commercial establishments want this economical summer cooling. They also want an adequate fan that will perform quietly and efficiently. Flimsy fans just don't work out. BREEZ-AIR Attic Fans give user satisfaction, just as "Buffalo" Industrial Fans have for 79 years.

But it's not a minute too soon for you to get set for this big year. Write us for all the details, sales and advertising aids—then stock up on BREEZ-AIR.

Write for Bulletin FM-20 and prices.

"Buffalo"

BUFFALO FORGE COMPANY
Buffalo, New York
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

INDUSTRIAL EXHAUSTERS BELTED VENT SETS
PROPELLER FANS "E" BLOWERS-EXHAUSTERS

Mr. Edwards is a native of Pineville, a graduate of Berryhill High School, and studied at Kings Business and Charlotte Colleges. He joined Mill Power Supply Co. in 1934 as a mail clerk and was assistant purchasing agent when he joined Duke last year.

Several personnel changes and appointments in the **National Association of Electrical Distributors** have been announced by **Arthur W. Hooper,** executive director.

William Mumpower, formerly assistant to the executive secretary, is promoted to the newly-created position of secretary, committee activities. In this post, Mr. Mumpower will be in charge of all commodity and general committee work of the association, with the exception of the Education Committee which will remain under the supervision of the executive secretary, **Alfred Byers.**

Thomas F. Preston, public relations manager, is promoted to the newly-created position of secretary, field activities. In this post, he will be in charge of all field work pertaining to area and zone meetings held around the country. He will be responsible for organizing, scheduling and arranging these meetings in addition to conducting them, along with the executive director and executive secretary. Mr. Preston will also continue to supervise the public relations department for the association and act as its manager.

Donald E. O'Shea, formerly on the editorial staff of Engineering News-Record, has been engaged as an assistant in the public relations department. While serving with the U. S. Army, Mr. O'Shea became Unit Troop Information and Education Director.

Roy H. Knox, who has been assistant division supervisor of residential sales, **Alabama Power Company,** Birmingham, Alabama, has been appointed division supervisor of residential sales, succeeding **D. S. Richard,** who has retired.

Mr. Knox began work with the former Birmingham Electric Company in 1924, serving as residential salesman, sales supervisor, and assistant residential sales manager. Until merger of Birmingham Electric Company and Alabama Power Company, he was manager of the former company's sales promotion and advertising department.

The appointments of **W. Rex Becker** as sales manager, Consumer Products, and **Robert D. Graham** as sales manager, Construction Products, for **General Electric's** Wiring Device Department have been announced by **Donald O. Cady,** department manager of marketing.

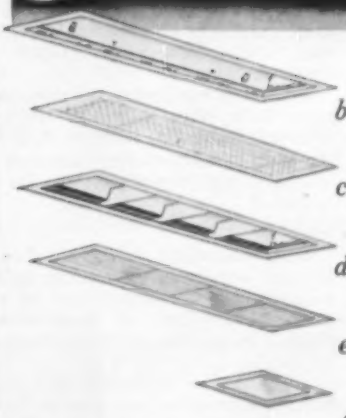
Mr. Becker, who will handle the sales responsibilities for wiring de-

Variety is the spice of light

with BENJAMIN *Trofferlites!*

In store lighting, too, variety adds spice! It's that extra touch in a lighting installation which lends a sales-stimulating atmosphere to an otherwise run-of-the-mill lighting job.

With Benjamin TROFFERLITES it's easy to achieve that different, modern look that makes people want to buy. With their wide variety of designs, styles and arrangements, you can achieve the exact effect you want. Slim, clean-cut appearance enhances the atmosphere you want to create. Recessed construction, which makes them appear to be part of the ceiling, fits TROFFERLITES into any architectural scheme. Bulletin AD 6315 shows how to put TROFFERLITE Variety to profitable use! Write: Benjamin Electric Mfg. Co., Dept. Z-1 Des Plaines, Ill.



M-873

Sold Exclusively through Electrical Distributors

Variety like this adds spice to your store lighting!

Variety too, because Trofferlites bring you the right *QUALITY* of light...

a. HOLOPHANE CONTROLENS®	*e. GLASS ENCLOSED*
b. OPEN	*f. CORNER FILL-IN*
c. LOUVERED	*g. SPOTLITE*
d. BAFFLED	®© The Holophane Co.

...the right *QUANTITY* of light!

12" width regular unit	for T12, Slimline, or Rapid-Start lamps.
12" width shallow unit	1, 2, 3, 4, or 6-lamp units.
24" width regular unit	
24" width shallow unit	

vice products which are sold to consumers through retail outlets, is a graduate of Iowa State College and has been with G-E since 1937. Previous to his present appointment, he was sales manager for the department's construction products.

Mr. Graham, who has been named to succeed Mr. Becker, was formerly commercial engineer for the Wiring Device Department. A graduate of Pratt Institute, he has been with G-E since 1942. In his new position, he will be responsible for wiring device products which are sold through electrical wholesalers and for electric radiant heating systems which are marketed through wholesalers and heating contractors.

Both men will have their offices at 95 Hathaway St., Providence, R. I.

The board of directors of **Duke Power Co.** announce the election of **Vance Huggins,** Charlotte, N. C., as treasurer of the company, and **Philip B. Hearit,** New York, as secretary, succeeding the late Walter C. Parker. Meeting in Charlotte, the Board also elected a director, an assistant secretary, and an assistant treasurer.

Elected to the Board was **Thomas L. Perkins** of New York, a member of the law firm, Perkins, Daniels & Perkins, long associated with the Duke interests, and a trustee of The Duke Endowment.

Named assistant treasurer was **R. E. DuMont** and the new assistant secretary is **C. E. Buchanan,** both of Duke's New York office.

A native of Chester, S. C., Mr. Huggins joined Duke Power in 1950 as comptroller. He is a certified public accountant and had previously been associated with Haskins & Sells since 1927.

James B. Irwin has been named sales manager of **Eastern Insulated Wire Corp.,** Wallingford, Conn., a recently acquired division of **Circle F. Mfg. Co.,** of Trenton, N. J. The announcement was made by **Edward A. Ring,** president of Eastern Insulated Wire Corp., and vice-president of Circle F. Mfg. Co.

Mr. Irwin was formerly sales manager, Bulk Wire Sales, of Hatfield Wire and Cable Co., Hillside, N. J. He has also had broad experience as a salesman and manufacturers' representative.

W. I. Whitefield, a veteran of over 40 years service in the electric utility industry, retired as manager of the Roanoke division of **Appalachian Electric Power Co.,** effective January 1.

In making the announcement, **G. L. Furr,** vice-president and general manager of the company, said that **Joseph D. Lawrence,** assistant division manager, will succeed Mr. Whitefield as manager of the Roanoke division.

A native of Danville, Va., Mr. Whitefield was graduated from Virginia Military Institute in 1911 with a B.S. in electrical engineering. He worked for the General Electric Co. at Lynn, Mass., as a student engineer following his graduation. In 1913 he became associated with the electric department of the City of Danville as a turbine and meter helper.

In 1915 Mr. Whitefield came to Roanoke as assistant superintendent of the Roanoke Railway and Electric Co. Eight years later he was made general superintendent of the company. In 1929 after Appalachian had acquired the properties of the Roanoke Railway and Electric Co., he was named district manager for the company here. He became assistant division manager in 1940 and division manager in 1943.

Mr. Lawrence, who has been associated with Appalachian and its associated companies since 1923, was graduated from the University of Pennsylvania with a degree in electrical engineering in 1922. A native of New Jersey, he came to Roanoke in 1946 as assistant division manager after serving with the company in Kentucky and West Virginia.

He has worked for the General Electric Co. at Schenectady, New York, and the Philadelphia Electric Co.

In 1923 Mr. Lawrence joined the Kentucky Power Co., at Sprigg, W. Va., as a meterman. In 1928 he was named district manager for Appalachian at Williamson and in 1943 he was transferred to Logan, W. Va., as district manager.

Technical books

Electrical Estimating

By Ray Ashley, McGraw-Hill Publishing Co., 327 W. 41st St., New York 36, N. Y., 363 pages, 208 illustrations, $8.00.

In this practical manual, electrical estimators get information they need to estimate quickly and accurately the cost of any electrical construction job.

Electrical Estimating covers every important element of estimating, from the selection and training of estimators and the proper use of estimating tools to the cost of preliminary estimates and the preparation of final bid sheets. It includes sample estimates, methods of checking estimates, preparation of labor cost units, how to figure markups, and many other pointers useful in solving problems of estimating, appraisal, cost accounting, and job scheduling.

New Buildings for USAF Air University...

WIRE BY PHELPS DODGE

Shown above are two of the four buildings recently finished for the Air Command and Staff School—largest school for the advanced education of Air Force officers—of the United States Air Force's Air University, Maxwell Air Force Base, Montgomery, Ala.

Reliable, long-life Phelps Dodge wire and cable, including Habirduct-Habirprene and Habirite-Habirprene, were specified and installed throughout all four buildings, which form the academic center of the famous Air Command and Staff School, to assure complete wiring satisfaction and trouble-free service.

* * *

On every wiring job, large or small, where top quality materials, expert workmanship and experienced "know-how" are called for, *it pays to rely on Phelps Dodge and your Phelps Dodge distributor!*

PHELPS DODGE COPPER PRODUCTS CORPORATION

SALES OFFICES: Atlanta, Birmingham, Ala., Boston, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Fort Wayne, Greensboro, N. C., Houston, Jacksonville, Kansas City, Mo., Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Ore., Richmond, Rochester, N. Y., San Francisco, St. Louis, Seattle, Washington, D. C.

The revised second edition devotes an entirely new section to labor units. This section includes tables of labor units which the experienced estimator may adopt as his standard units and which novices can use under guidance of senior estimators. Contractors and estimators will find this information most useful as well as a guide in preparing their own tables of labor-unit costs.

Included, too, are over 500 sell price units. Besides the addition of these up-to-date 1955 unit costs, other figures are retained, for aid in appraising established installations.

A comprehensive list of definitions will enable the electrical contractor to better explain the value of his services. Questions and answers on every section of the book help make this an ideal volume for self training.

Over 25 years of practical, active experience in all branches of the electrical-contracting industry are reflected in Electrical Estimating, second Edition. The author, Ray Ashley, is an electrical engineering and estimating consultant. He is a registered professional engineer, also a member of the Chicago Electrical Estimators' Association.

New products

Wall-to-wall lighting with Smithcraft units

SMITHCRAFT over-all illumination, an advanced design in wall-to-wall lighting systems, has been introduced by Smithcraft Lighting Division, of Chelsea 50, Mass. Presenting a "custom-made" appearance, Smithcraft over-all illumination introduces a mitered craftsmanlike framing for each of the plastic modules of the system. These framed modules provide relief from the monotony of an unbroken expanse of corrugated plastic by means of an interesting accent pattern.

The system incorporates an exclusive new levelling feature which saves in installation time. Once the supporting channels are levelled, all other parts of the system are automatically levelled and a level finished ceiling is assured. The system may be installed in new construction or in remodelling projects, regardless of the irregularities of the ceiling construction and of the location of pipes, ducts, beams or other obstructions.

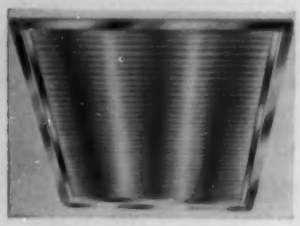
Because the framing runners of the corrugated plastic are V-shaped the V sections reflect light from surrounding areas, greatly reducing contrast between the supporting members themselves and the illuminated areas. As a result annoying black bands are eliminated. Lighting is uniform and comfortable and free from specular reflections or shadows.

Because of the shorter module lengths of Smithcraft over-all illumination (corrugated plastic sections are 8' long) access to lighting units or services above the system is easier. Sections of corrugated plastic shielding are simply slid in the track out of the way; no tools are needed. Because the corrugated plastic sections are only 8' in length, the system conforms to the National Building Code. There is a choice of three intensities determined by the three possible different module widths; 2', 2'8", and 3'.

Long-range floodlight designed by Stonco

A POWERFUL, new outdoor floodlight producing 115,000 candlepower with only a 500 watt rating has just been announced by Stonco Electric Products Co., Kenilworth, N. J.

This new unit concentrates its entire light output in an oval-shaped, high-intensity beam that is especially effective in long range floodlighting of railway and freight yards, piers, docks, golf driving ranges, and similar installations where floodlights must



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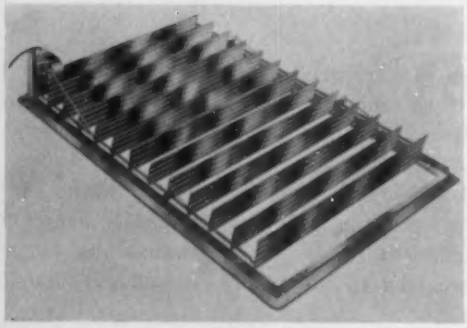

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AUTOMATIC CEILING SHUTTER
Outstanding Features of Model 610 Automatic Ceiling Shutter
- Neutral Aluminum Color Blends With Any Decoration and Color Scheme
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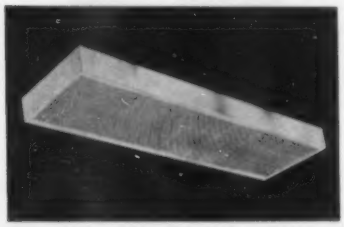
be mounted at a considerable distance from the area to be illuminated.

Construction is heavy-duty, non-corrosive, precision cast aluminum throughout with heavy internal and external cast ribs providing twice the normal heat dissipation surface area, and double the cooling rate from this one feature alone. Lamp life is stated at 2,000 hours or double the normal life of general service lamps in average use. The lamp is cradled in a high-temperature rubber cushion-seal that protects it from shock and abuse, and is sealed rain-tight and water-tight by a heavy-duty, cast aluminum hinged cover ring with heat-tempered clear, spred, or colored lenses.

Guth's new luminaires have Gratelite louvers

A NEW LINE of steel-sided, close ceiling luminaires called "Surfacers" has been announced by Edwin F. Guth Co., 2615 Washington Blvd., St. Louis 3, Mo.

A special feature of the "Surfacers" are clean, smooth 3/8" cube GrateLite louvers in 11" or 16" full widths. With full louver flow, uninterrupted by



ballast protrusions or joints, GrateLites afford beauty as well as illumination values.

Available for two and four lights wide and for four and eight feet lamps, these luminaires can be installed in units, rows, or pattern arrangements. "Surfacers" are die formed and electrically welded for greater rigidity. All steel parts are zinc plated and bonderized, finished white.

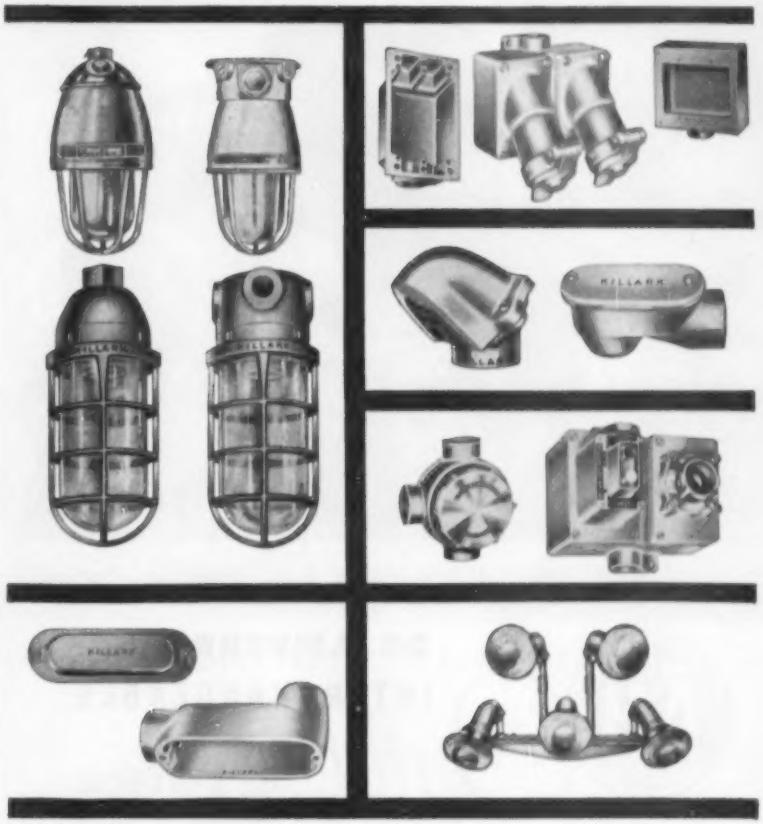
First weatherproof ballast offered by General Electric

TWO NEW fluorescent lamp ballasts, believed to be the industry's first weatherproof lamp ballasts for outdoor applications, have been announced by the General Electric Company's Ballast Department.

Built to meet Underwriters' Laboratories' weatherproof rain-tight specifications, the new ballasts are designed for use with fluorescent-lighted poster panels, billboards, and specialty plastic signs. All weatherproof units have a special zincplate, bonderize, and paint finish for protection against rust and corrosion.

Mounting requirements for the

KILLARK electrolets ... pioneers in ALUMINUM conduit fittings & fixtures



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120-277 VOLTS A-C ONLY

Quiet, safe, mechanical operation for both incandescent and fluorescent lights.

Here's a shallow switch that you'll agree is made-to-order for today's thin-wall construction and correspondingly shallow wall boxes. *The A-H Interchangeable Quiette Switch — smallest 20 ampere switch available — is less than one inch in depth!*

For your fluorescent installations you'll require a switch that can handle the heavier starting current. Again, this heavy-duty switch meets your need quietly, efficiently.

On your re-wiring jobs, this switch will permit ganging up to three devices in one standard wall box. And you'll be wiring more residences with Number 12 wire, requiring this 20 ampere switch.

For inspection and identification purposes, the metal plate or strap on the front of each A-H 20 ampere switch is colored red.

Available to you in single, double, 3-way or 4-way, with large binding screws and Ivorylite or Brown handles. Optional feature is Glo-Tip on handle so switch is instantly located during darkness.

Write for new folder (Form A-198) "A-H Quiette Switches Meet Every Lighting Requirement."

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Wiring Device Division, Dept. ES

THE ARROW-HART & HEGEMAN ELECTRIC CO.

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units are of the simplified three-bolt type, consisting of two hanger slots and one bottom slot. The junction box, with pressure-fit cover, is at the bottom of the case for quick inspection of connections. All leads are six-inch, number 14 weatherproof cable.

New fluorescent bracket announced by Markstone

NEW one piece, deep drawn fluorescent chrome brackets featuring instant start in the 15 and 20 watt size have been announced by Markstone Manufacturing Co., 2460 W. George St., Chicago, Ill. Slimly styled for smart, trim beauty, the versatile 4100 Series brackets are designed for either vertical or horizontal installations.

The new brackets are ideal for use with Markstone's complete line of glass shields, perforated and plain metal reflectors. Each bracket is equipped with swivel hangers and features Markstone's "E - Z - Off" method that tilts to any position with finger tip adjustment and is quickly removed for relamping or cleaning. The triple chrome plated fixtures contain a built-in outlet box cover.

Miller offers new industrial fixture

THE MILLER CO., Meriden, Conn., has introduced a new light weight industrial fixture designed to meet the requirements of modern service areas, light industries and home workshops. The new fixture is catalog number I-240.

The new fixture brings modern styling and color to the industrial field with the new "Miller Green" channel adding life and warmth to its appearance. The reflector is porcelain enameled 20 gauge steel for lifetime service and ease of maintenance and has apertures providing ample uplight to evenly illuminate the ceiling, minimizing glare and contrast. It is furnished for two 48-inch Rapid Start lamps only with ample knockouts provided for ceil-

ing or stem suspension and installation in continuous rows.

Other features include Bonderized metal, Baked Synthetic enamel finish on the wiring channel and ETL certified High Power Factor Ballast. The Industrial carries Bonderite, UL and AFL-IBEW labels and is ideal for use in light industrial areas, service stations, service areas, manual training shops, home workshops, laundries and many other installations requiring long service life lighting.

Smithcraft develops architectural troffers

A NEW LINE of architectural troffers has been developed by Smithcraft Lighting Division, Chelsea 50, Mass., the company announced recently. Termed "architecturally correct" because of its "clean," trim appearance, the new Smithcraft troffers are easily adaptable to all types of ceilings and achieve the utmost in lighting appearance and efficiency, as well as installation economy.

The new units are specifically designed to simplify installation—from start to finish, the only tool required is a screwdriver, and no careful time-

consuming measuring is needed to insure precisely finished installations, since leveling can be accomplished at any time by quick, easy screwdriver adjustment.

There are no visible catches, latches, hinges, bolts or screws in the Smithcraft architectural troffer. Door frames for glass and similar shielding and louvers are removable without tools or loose parts. A wide selection of shielding media is available, with or without integral trim flange. The precision-manufactured 12-inch module troffer is completely free from disturbing light leaks.

Automatic Switch offers coil-less type relays

NEW COIL-LESS type relays, designed to function like current transformers, have been announced by the Automatic Switch Co., 391 Lakeside Ave., Orange, N. J. A load cable running through the relay provides the magnetic field for relay operation.

Relays are used primarily for continuous welding operations. When so applied the load cable connected to

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the welding electrodes passes through the relay. Then as a function of the welding current, the relay operates to control the motor feeding the material to be welded.

Features of the new relays include ease of installation; pick up at relatively low currents; long life and low maintenance costs; mounting in any position; and adequate creepage distance.

American Zerlon adds "Trouble Detector"

AMERICAN ZERLON CORP., 35 W. 33rd St., New York 1, N. Y., has introduced a new, low cost patented "Trouble Detector" for use in locating defects in motors, turbines, dynamos, pumps, pipelines, automotive products, and machines of all types, by means of sound.

Consisting of a bent membrane and tripartite, screwed sound conductor with electric shock-protecting and sound-absorbing bar, the "Trouble Detector" is simple to operate. The sound conductor is placed against the area of suspected trouble and the membrane placed against the ear. Knocks, hammering, scratching, squeaks, and other trouble sounds are amplified, indicating defects due to wear and tear, lack of lubricant, loosening of bolts and nuts and other causes. Even an untrained, inexperienced operator will quickly learn to locate and isolate defects with the "Trouble Detector." In some cases, even the cause of the defect will be apparent by the sound heard. Very often, stripping-down of a machine or motor can be completely avoided.

All parts of the "Trouble Detector" are finished in highly polished nickel.

Advance offers narrow fluorescent lamp ballast

ADVANCE TRANSFORMER CO., 2950 N. Western Ave., Chicago 18, Ill., has designed and engineered a new narrow cross-section fluorescent lamp ballast for the efficient, quiet operation of two 96-inch or two 72-inch, T-12, Slimline lamps. The new ballast is only two inches high, 2-13/16 inches wide and 14¼ inches long.

The new Advance fluorescent lamp ballast makes it possible for designers and manufacturers to design lighting units less than three inches in depth.

The new Advance fluorescent lamp ballast design, Catalog No. BSEQ-275-S, is of the Series Sequence type, Circuit Voltage 110-125, 425 M.A. It bears the Certified Ballast Manufacturers and Underwriters Laboratories, Inc., labels.

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Examine this new book on conduit bending free. Chapters on mathematics, taking measurements, and making bends are simple and easy to understand. Examinations and answers are provided making this manual suitable for use in class rooms or home study. The table of contents is complete and easy to use so the electrician can quickly find the information needed to enable him to save time on conduit jobs.

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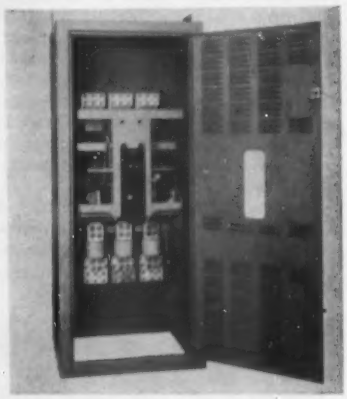
G-E service protector made in four ratings

A SERVICE PROTECTOR with interrupting rating up to 200,000 amperes for service entrance duty or feeder duty has been announced by General Electric Company's Low Voltage Switchgear Dept., Philadelphia, Pa.

The service protector is especially adapted to applications where high fault currents exist, such as on low voltage network systems in metropolitan areas.

The unit is available in four ratings: 1600, 2300, 3000, and 3500 amperes at 480 volts a-c, 60 cycles, with G-E type CLF fuses. These are the ratings including the fuses; no



further de-rating is necessary. It is supplied with a general purpose enclosing case or without a case for installation on a switchboard. Provision is made for connection either to bus or cable.

G-E says the service protector combines the interrupting ability of high-interrupting capacity CLF fuses with contacts similar to those used on air circuit breakers operated by a stored-energy mechanism. Speed of opening and closing, therefore, is not dependent on speed of operation of the manual handle by the operator. The load-break ability of the contacts is 12 times the current rating of the service protector.

More Neoprene now in Bronco cables

WESTERN INSULATED Wire Co., 2425 E. 30th St., Los Angeles 58, Calif., is now manufacturing a complete new line of portable electrical cords and cables bearing the name Bronco 66 Certified.

The outer protecting jacket of Bronco 66 Certified contains not less than 67.32 per cent new Neoprene. Jacket contents are certified by a registered professional engineer. Certification is affixed to every box and reel of the product.

The increased quantity of Neoprene in the jacket compound gives greater protection against factors in

the industrial environment which tend to attack portable power cables —such as oil, sunlight, ozone, abrasion, flame, acids, solvents, heat, and crushing.

Bronco 66 Certified cords and cables are vulcanized by a new and exclusive Synchro-Cure process. Synchro-Cure produces a smooth jacket and imparts great flexibility to the product.

Jackets are branded every two feet. Vulcanized into the outer jacket are the product name, Neoprene content, type, size, number of conductors, rated voltage, and "P116-BM." The latter symbol denotes official approval by the Pennsylvania Department of Mines and acceptance for listing by the Federal Bureau of Mines.

Rodale offers 3-wire grounding type devices

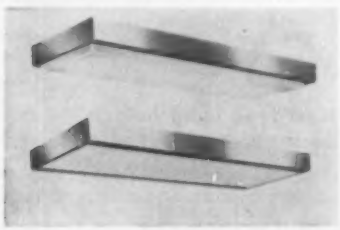
ANNOUNCEMENT of the addition of a complete line of tandem blade, 15 amp—250 volt, grounding type devices to their rapidly expanding line of heavy duty industrial wiring devices has been made by Rodale Manufacturing Co., Inc., Emmaus, Pa.

Included in the line are different types of receptacles, caps, cord connectors, a motor base, and an extension cord set in four cord lengths. In addition, there is a connector set in the popular Flip Seal design.

Manufactured from top-quality materials throughout, these heavy duty devices are designed for dependability and long trouble free service. All items are UL listed.

Sunbeam announces 6600 Visionaire series

THE 6600 SERIES Visionaire, recently introduced by the Sunbeam Lighting Co., 777 E. 14th Place, Los Angeles 21, Calif., is a shallow, surface-mounted unit of contemporary styling, designed to make lighting an integral part of the architecture.



The QSDP6600 series features a single-piece, smooth dropped Plexiglas diffusing medium with matte-finish for soft, low-brightness illumination, reduced glare and for architectural conformity with contemporary interiors.

The QPLM6600 series with a fully framed, one-piece, miniature-celled plastic louver offers 43 degree by 43

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CRIMP CONNECTORS

with the "Wrap-Cap"*

THE UNIQUE DIAPER-WRAP INSULATOR

ONLY 2 PARTS

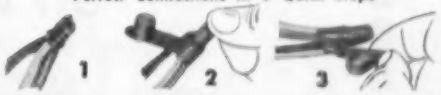
Both the cadmium plated steel sleeve and the "Wrap-Cap" Insulator are listed by Underwriters Laboratories, Inc. for general use, (600 V) in branch circuit and fixture wiring.

*Patented, No. RE23649 and other patents pending.

Anyone who can use a pliers can make a perfect wire joint every time with the IDEAL Crimp Connector! The whole operation takes just seconds!

Stronger, better insulated and easier to use, IDEAL Crimp Connectors give you perfect, pre-fabricated insulation all around the joint and between the wires, with a puncture-proof cap and *double thickness* over the wire ends, *plus* a deep skirt that completely covers the bare conductor even when wires are not stripped evenly.

Perfect Connections in 3 Quick Steps



1 Crimp sleeve with IDEAL Electricians pliers.

2 Push "Wrap-Cap" down over sleeve.

3 Pull tabbed cap between wires and over end of joint.

NO EXTRA TOOL NEEDED!

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degree shielding and lower even brightness, as well as pattern and texture interest for additional architectural appeal.

On all 6600 series, a "hook-on" hinge allows panels to swing open and remain hanging from the fixture body or to be lifted out without the use of tools, thus simplifying maintenance. When closed panels are held positively in place by spring catches, precluding disturbing light "leaks."

All units are Bonderized and finished in high-gloss baked white enamel and are available in fluorescent or slimline 24-, 48-, or 96-inch lengths.

New dryer cord set announced by Slater

A DRYER CORD SET with the NEMA "L" shaped blade has been announced by the Slater Electric & Mfg. Co., Inc., Woodside 77, Long Island, N. Y. Designed for continuous heavy loads, this sturdy dryer cord set (catalog #734) is rated at 30 amperes/250 volts and is U/L approved. It is available in lengths up to 48". Features include three coded conductors, extra-strong brass blades, molded-on rubber cap with finger grip for easy removal from power outlet.

Easy wiring possible with new Hubbell device

PRESSURE PLATE BACK WIRING is an outstanding design development introduced by Harvey Hubbell, Inc., Bridgeport, Conn., which answers the demand for faster, easier wiring at minimum installation cost, yet places primary emphasis on the security and safety of the connection. This method, an exclusive feature of many of the quality wiring devices manufactured at Hubbell, provides contractors, electricians and maintenance men with the time-saving, labor-saving convenience of modern back wiring plus the safety of a pressure plate screw connection.

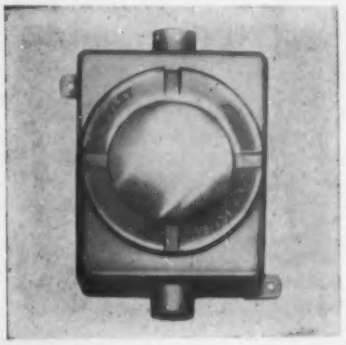
The stripped wire, when inserted in the pressure plate mechanism, through the reinforced back wiring holes locates between the terminal plate and the pressure plate which, as the screw is tightened, pressure-grip the wire securely. Actually, the electrician has a choice of using back wiring or side wiring. He can either insert the wire through the back wiring holes and pressure-grip the wire, or he can loop the wire around the side binding posts.

Both of these methods find practical application when a circuit needs to be extended. In such case, both back wiring and side wiring are utilized. The same binding screws anchor both the wires inserted through the back wiring holes and the extension wires looped around the side binding post, thus eliminating the need for extra splices. The old method required both incoming and outgoing wires to be wrapped around the same binding post—a bulky, awkward job at best and often insecure.

Because of the difficulty of visualizing this method, Hubbell is offering, free of charge, an actual pressure plate contact assembly attached to a molded base so that customers can see and demonstrate this new wiring system.

New instrument enclosures are read without opening

FOR CONVENIENT reading of enclosed meters, gauges or similar devices in hazardous locations, the Pyle-National Co., Chicago manufacturer of industrial electrical products, has developed a new series of instrument enclosures which makes it unnecessary to open the enclosure when taking readings.



Equipped with a threaded cover and a heavy round glass window, the "Pylets" are furnished in four body sizes with ¾ inch hubs for rigid conduit in both dead end and through feed types. Other hub arrangements are available. Drilled mounting feet are provided.

The enclosure is explosion-proof, dust-tight and rain-tight.

New type lamp holder designed by Magni-Flood

SEALED resistant mogul prong lamp holders containing positioning lugs as well as positioning clamps to hold floating socket and lock lamp pattern in position have been designed by Magni-Flood, Inc., Mt. Vernon, N. Y.

Magni-Flood designed hinged ring holds lamp in position for sixty-second lamp replacement. It is complete with lens clips and lenses are available. Drain holes are placed for maximum all-weather protection and lamp cooling in conjunction with the exclusive base gasketing.

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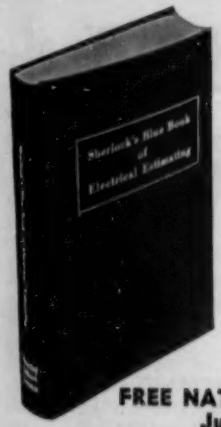

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FREE NATIONAL ELECTRICAL CODE BOOK
Just For Examining Blue Book

This book was written by a successful electrical contractor and estimating engineer with over 20 years' experience. It has an entirely different method of determining estimates on wiring jobs. Electrical contractors, journeymen, architects, and engineers will find use for this book every day. Gives time required to do jobs along with complete labor charges in every state in the country. Order this book now at special introductory price of $7.75. As a special offer to Electrical South readers the publishers give a free copy of the latest National Electrical Code Book just for examining the 1956 Blue Book of Electrical Estimating.

ESTIMATING HANDBOOKS ASSOCIATES — DE KALB, ILL.

Send me the NEW BLUE BOOK OF ELECTRICAL ESTIMATING and the latest edition of the National Electrical Code Book for 5 days free trial. I understand I may return the book within 5 days and owe nothing. If I keep it I will pay $7.75 plus postage for shipping. I keep the Code Book FREE even if I return the Blue Book of Electrical Estimating.

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ADDRESS

TOWN ZONE STATE

☐ I enclose $7.75 to save shipping cost.
☐ Send C.O.D. I'll pay postman $7.75 plus C.O.D. fee on delivery.

February, 1956

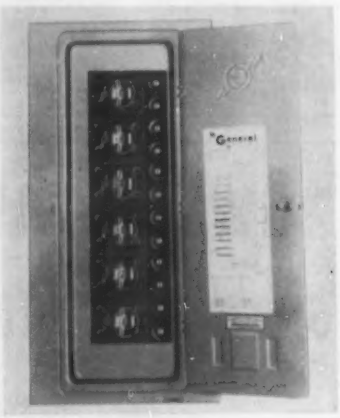
New cable available in several sizes

THE availability of new 100-ampere service entrance cable, 75° C. rating, wet or dry, has been announced by General Cable Corp., 420 Lexington Ave., New York 17, N. Y. The cable is offered in either 3 conductors of #3 wire, or 2 of #3 wire and 1 of #5. General Cable distributors are now well stocked with the new cable.

New General unit has built-in AW features

IDEALLY SUITED for the many major appliances in today's modern home is the Control-All, Jr., recently introduced by General Switch Corp., 45 Roebling St., Brooklyn 11, N. Y.

Rated at 125 amperes, the Control-All, Jr., provides within one enclosure (24 inches high by 11½ inches wide by 3⅝ inches deep) six independent, two fuse pullout switches and 12 plug fuse branch circuits. Since the unit does not exceed six service switches, no overall disconnect is required where the National Electrical Code applies.



The six pullout switches act as individual "means-of-disconnect" for console ranges, washer-dryers, dryers, water heaters, air conditioners, and "built-in" kitchen appliances, and as a "Lighting Main" for 12 30 ampere plug fuse branch circuits, sufficient in number for all 110 volt lighting and appliance circuits.

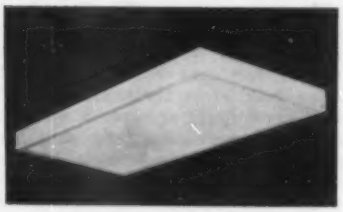
The device provides two 60 amp and four 30 amp pullout switches. The uppermost pullout switch is regularly supplied as a 30 amp disconnect (Catalog No. 1041-12) and is purposely left unbussed to permit its use as a separate and independent water heater disconnect.

This same pullout switch is also available as a 60 ampere disconnect as Cat. No. 1041-12W. The line lugs are approved to accept wire size from #8 AWG up to and including #1/0 AWG and devices are available in both surface and flush enclosures.

Electro-Silva-King adds new fluorescent series

EXTRA-SHALLOW Surf-A-Lite, for flush-to-ceiling mounting, augments the line of commercial and industrial fluorescent and incandescent lighting equipment from Electro Silv-A-King Corp., Chicago, Ill., and Reading, Pa.

Just 3½", full height, the Surf-A-Lite is available in 12", 17", and 24" widths and provides innumerable design possibilities on the part of the



architect since, without any additional accessories (spot boxes, couplings, etc.), it can be mounted in continuous rows, in pattern groupings, as well as individually mounted. The rectangular cross-section permits flush, fixture-to-fixture mounting.

For simple installation and maintenance, the housing is of one-piece code gauge steel with integral ends, and sides, finished in lifetime "Liquid-plastic" baked enamel. The wireway cover is installed and removed without tools by a newly designed and simple snap-on device. The louver door is cleaned by simply cleansing it in a detergent bath, and allowing to air-dry.

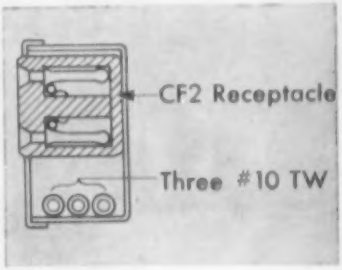
The Surf-A-Lite is especially adaptable to the new trend toward constructing low ceilings, as well as for remodeling where dropped ceilings are utilized—in offices, stores, schools, or institutions.

Line of Plug-In Strip handles branch circuits

A NEW LINE of Plug-In Strip, equipped with an integral raceway to handle branch circuit conductors in addition to its standard use in providing electrical outlets, has been announced by the manufacturer, National Electric Products Corp., Gateway Center, Pittsburgh, Pa.

Designed as Type CF-4 Plug-In Strip, the new line was developed in answer to contractors' requests for a method of running branch circuits, 110 and 220-volt service, in the same duct that carries the Plug-In Strip harness. These provisions make possible a normal Plug-In Strip installation while providing the capacity to handle additional single-phase or three-phase load within the limits of the Number 10 conductors.

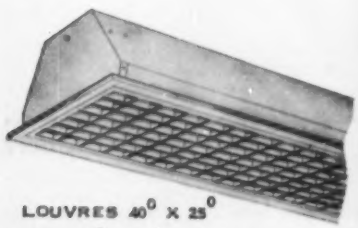
Underwriters' Laboratories, after what have been described as "exhaustive pull tests," have granted approval for installing up to three Number 10 Type TW electrical conductors in the raceway space located



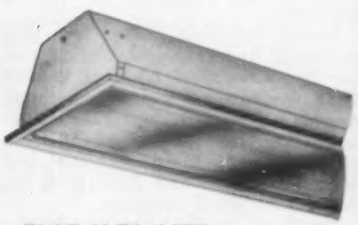
beneath the standard Plug-In Strip assembly. The additional conductors, in accordance with the Electrical Code, may be wired either three-phases or single-phase.

A ¾ inch knockout at each end of a 6 foot strip, allows in-and-out accessibility of additional branch circuit wires without special feed fittings.

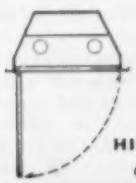
National Electric points out that the new Type CF-4 will serve primarily commercial and industrial applications with their characteristically heavier loads. Particularly adaptable for air-conditioning unit installations, the Plug-In Strip is available with



LOUVRES 40° X 25° AND 45° X 45°



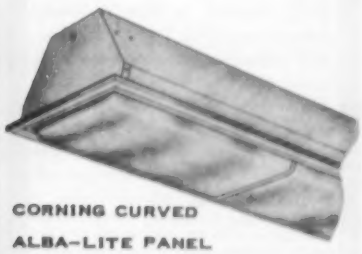
FLAT ALBA-LITE RIBBED PANEL



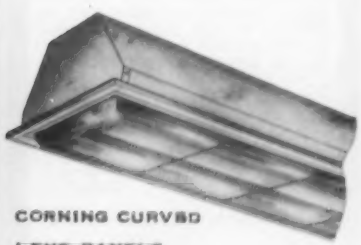
HINGES FROM ONE SIDE

SOUTHERN RECESSED TROFFERS

COMPLETELY NEW IN DESIGN THESE RECESSED TROFFERS ARE CONSTRUCTED OF HEAVY GAUGE, DIE FORMED COLD ROLLED STEEL, THE MANY ACCESSORIES SUCH AS FLAT ALBA-LITE GLASS PANELS, CURVED LENS PANELS AND THE 40° X 25° OR THE 45° X 45° SHIELDING LOUVRES MAKE THIS TYPE FIXTURE ADAPTABLE TO MANY INSTALLATIONS. WIRED FOR 2, 3, OR 4 LITE REGULAR FLUORESCENT, RAPID START, AND SLIMLINE BALLASTS. DETAILS FOR THESE AND MANY OTHER TYPE FLUORESCENT FIXTURES BY SOUTHERN ARE AVAILABLE IN OUR NEW 1956 CATALOG. SEND FOR YOURS NOW. SOLD BY LEADING ELECTRICAL WHOLESALERS.



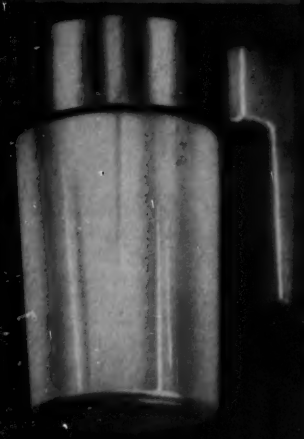
CORNING CURVED ALBA-LITE PANEL



CORNING CURVED LENS PANELS

SOUTHERN LIGHTING MFG. CO. 501 ELWELL ST. ORLANDO, FLORIDA

design by mcPhilben



A Vapor-Tight Wall Bracket

dynamically new . . . obsoletes all old wall brackets!

A modern building with yesterday's fixtures is like a lovely woman wearing last year's hat. McPhilben's new multi-use wall bracket the '43-40 series is beautifully honest in design . . . of rugged, no maintenance-needed, die cast aluminum vaportight, versatile and competitively priced.

APPLICATIONS: Stair landings, Corridors, Lavatories and Entrances, Schools, Hospitals, Office buildings and Housing.

SPECIFICATIONS: 43-40 VT, die cast aluminum, satin finish anodized, quickly mounts to 4" cast iron junction box . . . for indoor application suitable for standard outlet box. WATTAGE: Maximum 100 watt — Globe: Threaded opal with gasket. Write for Data Sheet on complete VAPORTIGHT SERIES.

DIE CAST PROTECTIVE GUARD AVAILABLE (43-44VT) for locations where protection against theft and vandalism is essential. Also available as a ceiling fixture.

1349 Willoughby Ave., Brooklyn 37, N. Y.

CONSULT mcPhilben Lighting SPECIFY

Representatives in major cities
Stocked By Electrical Wholesalers

either standard two-wire or grounded type receptacles every 6 or 18 inches. They also anticipate that the new CF-4 will find residential applications as well, especially in apartment buildings where air conditioning has created service problems.

The new CF-4 Plug-In Strip will allow for easier installations by the contractor and will provide the distributor with a complete new line of material without increasing his fittings inventory. The present standard Type CF-3 Plug-In Strip fittings will accommodate the new strip.

Ramset fastening tool receives formal showing

THE NEWEST of the Ramset construction and maintenance fastening tools, the Duo-Jobmaster, had its first formal showing at the recent Plant Maintenance and Engineering Show in Philadelphia.

The Ramset tool is made by Ramset Fastening System, Winchester-Western Division of Olin Mathieson Chemical Corporation. Its headquarters are in Cleveland.

The Duo-Jobmaster, because it can be used for either a ⅜-inch stud or ¼ inch stud with only a simple change of the barrel, makes it possible for the single tool to be utilized for 90 percent of the usual fastening jobs in construction. Moreover, the change of the barrel can be made on the job. A man working on a scaffold wouldn't have to get off it to make the conversion.

Eagalok wiring devices designed for large motors

A NEW LINE of four wire - 20 amp Eagalok caps and connectors, for use with three-phase large size motors, has been developed by Eagle Electric Mfg. Co., Inc., Long Island City, N. Y.

Eagalok locking devices are designed to provide a continuous flow of electricity under the severest shock or vibration conditions. They lock easily by an effortless turn. All Eagalok devices are interchangeable with other standard locking devices.

These caps and connectors have heavy duty black bakelite bodies, armored with plated steel, which is knurled for easy removal. Eagalok four-wire devices are available with or without the armor grounded. Both caps and connectors are equipped with non-removable, adjustable cord clamps which afford absolute strain relief. Cord holes are extra large to take heavy wire.

Connectors have double wipe, phosphor bronze contacts, securely riveted through bakelite—no screws to loosen. Assembly screws are anchored in bakelite and will not fall out when disassembled. All devices have large terminal screws and plenty of room for wiring.

Besides these new four-wire devices, included in the Eagalok line are two- and three-wire caps and connectors each in 10 and 20 amp sizes. The complete Eagalok line is listed by Underwriters' Laboratories and CSA Approved.

Free bulletins

available to our readers

A new 75-page panelboard catalog that includes 20 pages of **engineering data** pertinent to **panelboard installation** and selection has been published by **Federal Pacific Electric Co.**, 50 Paris St., Newark 1, N. J.

The new catalog, titled "Modern Panelboards," is illustrated with photographs, drawings, diagrams and specifications that describe the features and construction of each panelboard and assist in their application. Circuit breakers as well as fusible disconnect devices used in lighting and distribution panelboards are described in detail. Among the engineering data included is information on transformer connections for distribution voltages; relevant National Electrical Code and Underwriters' Laboratories requirements; and circuit breaker characteristics.

Keeping pace with the construction industry's tremendous acceptance of aluminum during 1955, **Aluminum Company of America** has released five new booklets offering up-to-the-minute information on **aluminum architectural and industrial building products.**

Slated for insertion in the 1956 edition of Sweets Architectural Files, the five illustrated booklets include Wall Systems of Alcoa Aluminum, Aluminum in Architecture, Aluminum Products for Industrial Construction, Aluminum Roofing and Siding Products, and Aluminum Industrial Building Products.

Copies of the booklets may be obtained by contacting the nearest Alcoa sales office or by writing Room 773 Alcoa Building, Pittsburgh 19, Pa.

The first complete compilation of all **controller renewal parts** for all electric apparatus and motor controls is being offered now by **Brownell Distributors, Inc.**, 690 Murphy Ave., SW, Atlanta, Ga. The catalog may serve as a reference book to eliminate delay in procuring controller renewal parts.

Complete information on **aluminum triplex service drops** is included in a new booklet issued by **Kaiser Aluminum & Chemical Corp.** The 20-page illustrated publication discusses the various types and sizes of triplex available from the company, tabulates cost comparisons, cites advantages and discusses methods of dead-ending and connector selection.

In a separate section specific questions on cost, efficiency and related information are answered. The booklet may be obtained from Kaiser Aluminum & Chemical Corp., Industrial Service Division-PR 255, 1924 Broadway, Oakland, Calif.

National Electric Products Corp., Pittsburgh 22, Pa., world's largest manufacturer of electrical distribution systems, has printed a new catalog (No. 445) on its 4x4 and 6x6 Wirewa **metal raceways.**

Both sizes, which come in standard sized sections for housing electric wires and cables, are featured in the catalog. The hinged lid feature of the duct permits access to the wires and cables at all points throughout the system for tapping, splicing, or other changes without disturbing existing work.

The systems are approved for use in the installation of feeders, branch circuits, control and signal wiring, as well as in extensions of armored cable, flexible metal and rigid conduits, electrical metallic tubing, and surface metal raceways.

Complete information on heavy-wall and thin-wall **steel raceways** is offered in a new 20-page booklet just announced by **General Electric's** conduit products department. This booklet covers galvanized and black enameled rigid steel conduit, electrical metallic tubing, and plastic-coated steel conduits.

In addition to complete descriptions and specifications, the booklet contains a number of data tables on allowable conduit and EMT fill for various cable types. Considerable test data is also included.

The booklet, publication No. 18-255, is available without charge from General Electric Co., Construction Materials Advertising, Bridgeport 2, Conn.

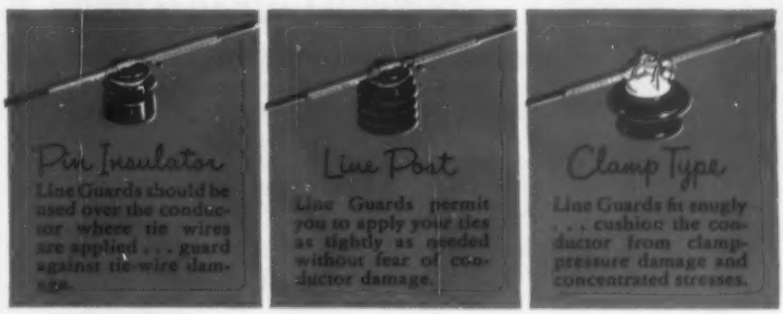
A new booklet on brooding methods, **Infrared Heat on Your Farm for Brooding and Scores of Daily Chores,** has been issued by **Sylvania Electric Products, Inc.,** 1740 Broadway, New York 19, N. Y. The new booklet describes some of the profitable uses of infrared lamps in brooding chicks, pigs, lambs, calves and other kinds of livestock. The purpose of the manual is to show the farmer how to boost farm production and profits through modern brooding methods.

• Preformed Line Guards will save money on short-span urban distribution lines . . . whether ACSR, all-aluminum, or copper conductors are in use. Use them on all conductors where protection against vibration damage is not essential and standard Armor Rods may not be needed. Line Guards are smaller in diameter—fit insulator grooves of both old and new designs. Check P L P price lists. You will notice Line Guards are *lower* in price than Armor Rods . . . yet, Line Guards provide sufficient protection on short spans.

Line Guards . . . developed from Armor Rods—are used like Armor Rods . . . protecting conductors against arcover, chafing, and mechanical wear due to concentrated stresses on light or short-span construction.

Let your P L P Representative help you select the most economical P L P Product for your application. Write or call Cleveland: EX 1-3571.

**Made in accordance with or for use under one or more of the following U. S. Patents: 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.*


Pin Insulator
Line Guards should be used over the conductor where tie wires are applied . . . guard against tie-wire damage.
Line Post
Line Guards permit you to apply your ties as tightly as needed without fear of conductor damage.
Clamp Type
Line Guards fit snugly . . . cushion the conductor from clamp-pressure damage and concentrated stresses.

PLP **PREFORMED LINE PRODUCTS CO.**
5349 St. Clair Avenue
Cleveland 3, Ohio

An 8-page booklet featuring the first general purpose **industrial motor and generator brush** is announced by **National Carbon Co.**, a division of Union Carbide and Carbon Corp., 32 E. 42nd St., New York 17, N. Y.

Written for designers of electrical equipment, electrical and maintenance superintendents, and purchasing agents, it discusses in easy-to-read terms the characteristics and operating behavior of the most outstanding brush development in twenty years, the new "National" N-4 brush. Since the new brush is especially recommended where heavy load-swings require exceptional brush characteristics to assure smooth, trouble-free operation and optimum commutation under all service conditions, a number of "in-service" reports define its record on main drive motors and generators, rotary converters and heavy-duty motors.

A new bulletin (DM-5556) giving complete information about the company's line of **Type N-SD service drop cables** has been issued by **Anaconda Wire & Cable Co.**, 25 Broadway, New York, N. Y.

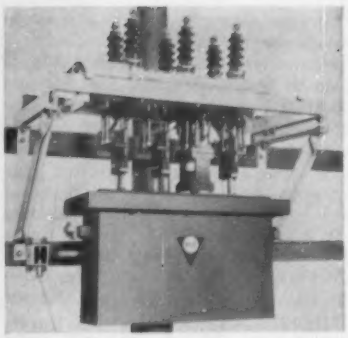
The cables are available with either copper or aluminum conductors; and conductors are insulated with either rubber and neoprene jacket, or with neoprene or polyethelene. The low-cost cables are light and easy to handle. The insulated conductors are wrapped around the bare neutral-messenger, which bears the full weight of the assembly.

A new 32-page catalog describing the complete line of G-E **control transformers** is available from the **General Electric Co.**, Schenectady 5, N. Y. Including autotransformers, machine tool transformers, and special application models, the illustrated publication is designated GED-2767. It contains ratings, dimensions, product features, and model numbers. Also included are list prices, weights, and wiring diagrams.

Tank Hoist

(Continued from page 50)

by Line Material Co., Milwaukee, Wisc. With the new device, an oil-filled recloser tank can be easily lowered to expose the recloser mechanism and then easily raised to join the recloser head. It can be either left in place at the recloser installation or readily moved to facilitate inspection of other Type R reclosers. The hoist assembly consists of a crank handle, worm-drive windlass, and non-corrosive steel cables.



The tank hoist can be ordered either for units in service or with new reclosers from the factory.

The Kyle Type R recloser is a circuit interrupting device having an interrupting rating up to 6000-amperes symmetric. It has a 2-cycle clearing time. Accessories are available enabling the Kyle Type R recloser to be used as a remote controlled circuit interrupting device.

Substation design

(Continued from page 47)

nects or transfer switches in connection with an auxiliary bus and bus tie breaker can be readily and economically used to operate from either bus.

Air break switches are special forms of disconnect provided with an operating means for quick break between the blade and contact. Recent developments have extended the use of air break switches to high voltages, and under certain conditions, they can serve in place of circuit breakers.

AIEE meeting

(Continued from page 43)

years operating experience with 14.4/24.9 kv to serve rural customers.

"The over-all cost, including transformers, of a new 14.4/24.9 kv system," they said, "is about 20% higher than an equivalent new 7.2/12.5 kv system, assuming the same size conductor and phasing. On the other hand, since the line capacity is quadrupled, the construction cost per kw of capacity of the 14.4/24.9 kv system is approximately 30% of the 7.2/12.5 system of the same conductor size and phasing."

They reported that some 75 systems have constructed 33,000 miles of the higher voltage lines since 1948, the bulk being in the western and southwestern states where the lower voltage lines are not feasible

EASY DOES IT

No threads to cut . . .
Simple one-step installation

Blackhawk's **NEW** *Slip-fitter Service Entrance Head*

This completely-protected Blackhawk slip-fitter Service Entrance Head is available in all popular sizes.

Immediate delivery to electric wholesalers only.

Specify B-I When You Buy!

Easy does it . . . when it comes to selling. Now you can offer a *one piece* Service Entrance Head . . . one that doesn't require threads, extra clamping pieces or separate slip-fitters. The Blackhawk service head *is* the slip-fitter.

Easy does it on installation . . . simply slip the unit over the conduit and tighten the set screws. The Blackhawk slip-fitter Service Entrance Head is then securely in place.

Easy does it . . . in use. Absence of threads makes it possible to use Blackhawk Entrance Head in tight situations where a threaded fitter won't work — such as installed conduits close to walls.

Blackhawk Industries
Dubuque, Iowa

Contact Your Nearest Representative—
Griffin & Griffin, Box 7374, Station C, 931 W. Peachtree St. N.E., Atlanta, Ga.
Paul Mayo, Jr., 1725 Arlington Rd., Richmond 20, Va.
Keith Wahlstrom, 821 N. Rockford, Rockford, Ill.
John R. Collins, Box 5661, Jacksonville, Florida

economically, as the area is sparcely settled. On the other hand, the higher voltage lines have been utilized in the eastern and southern states as a means of solving load growth problems.

They summed up the REA experience with the higher voltage as follows:

"With a development such as this, it was to be expected that some new problems would arise. However, some of the more serious ones that had been predicted have not occurred. The difficulties which have been encountered have been eliminated or reduced to such proportions that the operation of the 14.4/24.9 kv lines compares favorably with 7.2/12.5 kv lines.

"The experience of the past seven years has justified the adoption of 14.4/24.9 kv as a standard REA voltage. It is anticipated that this higher voltage will be used extensively to increase the capacity of existing systems. The use of this voltage has definitely been economical in the construction of new systems in territory that it is not feasible to serve at lower distribution voltages."

Electrical living

(Continued from page 29)

much praise for the efficient handling of electrical problems by the personnel involved. She is thoroughly sold on the heat pump installation, which during the past summer kept the house adequately cooled, and now is performing efficiently during cooler weather.

This case history of an actual sales performance has had its counterpart many times over, with almost every member of the selling staff of MP&L playing a principal role.

Although the scene is different in every case, the methods are the same; they include the initial contact, the creating of interest, arousing the desire to buy, and the accomplishment of the objective, which is, the use of more electric power in the territory served by the Mississippi Power and Light Company.

Aids to the industry

"However", says Stuart Thomas, division sales manager, "At no time does a member of our staff recommend the purchase of any specific brand of equipment. We work with and for all electrical appliance dealers and distributors, and wiring contractors, in an ef-

BE SURE! USE M&W

watertight connectors

with new protection you need!

Now! A good connector with a conical compression ring that pulls up watertight, seals the tapered Neoprene bushing uniformly around the cable. Has extra take-up capacity, too.

LOW IN COST! HIGH IN PERFORMANCE!

Made in 2-screw or hex-nut types. Fit ¾" to 1¼" hub or knock-out; cable sizes from 10/2 to 2/3. Write for details and new Catalog No. 20-B.

Water-Tight Connectors — Non-Water-Tight Connectors — Service Entrance Kits — Service Entrance Caps, Straps and Sill Plates — BX and Romex Connectors.

Cut-away View

Shows new conical compression ring that seals bushing tight around cable.

M&W Electrical Fittings

The M. & W. ELECTRIC MFG. CO., Inc.

EAST PALESTINE, OHIO

FOR SATISFIED CUSTOMERS

INSIST ON THE NAME

AMERICAN *Bonded* ARMORED CABLE

An extraordinary ability to absorb punishment and still deliver top performance has made AMERICAN BONDED ARMORED CABLE the favorite of thousands of contractors, electricians and industrials in the Southern market. AMERICAN'S reputation for rugged durability is your assurance of installations that meet the most stringent requirements. Ask for AMERICAN by name!

AMERICAN METAL MOULDING CO.

146 Coit St. Irvington 11, New Jersey

Atlanta Warehouse
C. C. MYRICK
516 Elm, N. W.
Atlanta, Georgia

Houston Warehouse
PEABODY BROTHERS
240 Shea St.
Houston 2, Texas

Dallas Warehouse
PEABODY BROTHERS
3015 Taylor St.
Dallas, Texas

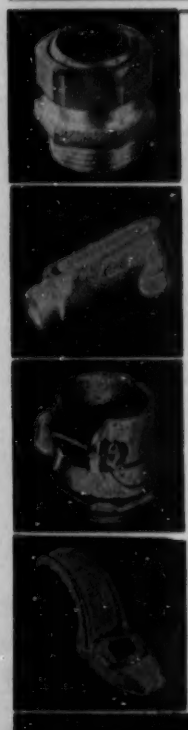
K&H
UNIVERSAL PRESSURE TYPE
ADJUSTABLE LUGS

One or two bolt holes

Wire sizes Nos. 14 to 1,000,000 CM. One-piece construction—easily installed. Body is well proportioned to withstand excessive use, with ample thread area. Makes tenacious grip on stranded conductors, forcing contact with each wire in strand, thereby insuring utmost in conductivity—bottom of tongue surface is ground. Not susceptible to release under vibration.

Write for dimensions and prices

KRUEGER & HUDEPOHL, INC.
VINE AT THIRD E. 5 CINCINNATI 2 OHIO



FOR MODERN QUALITY FITTINGS
Specify
ATLANTIC

ACE

ATLANTIC CONDUIT FITTINGS COMPANY
BOSTON MASSACHUSETTS

fort to co-ordinate our mutual activities. We merchandise only our own service; the dealer sells his appliances, and the contractor his service.

"In co-ordinating our programs with dealers, distributors and contractors, our residential and dealer salesmen follow through with planned helps for appliance dealer salesmen and contractors. These include the training of dealer personnel in the use of all types of appliances and electrical service. We are always available for consultation and help in solving complicated wiring problems. Our home economists go into the dealer customers' homes and work with them until they thoroughly understand the most economical use of the appliance or service.

"Our advertising department furnishes a large amount of newspaper copy with which the enterprising dealer or contractor may tie in. All of us are working as a team to bring electrical living to everybody."

Home lighting sales

(Continued from page 27)

that they would probably not "break even" in the first year of operation. However, results in both areas show that new business is being added at the rate of $1.00 of estimated annual revenue for each 63c of increased promotion expense. Even better operating ratios are expected in the second and succeeding years.

Case histories

The following capsule case histories indicate the broad effectiveness of the program on all trade segments.

A custom builder of small homes is installing complete light conditioning in almost every home. Standard procedure for the builder is to send his plans to the utility for the lighting and wiring layout, and to utilize utility help in selling the buyer. Small two-bedroom homes now contain from 16 to 20 fixture outlets, for a total of 2,800 to 3,400 watts connected. As the result of the lighting specialist's subsequent work with a customer who bought one of the homes, eleven good quality portables were sold for use in a two-bedroom home.

One customer, through a neighbor, had heard about the lighting advisory service offered by the utility. She requested help in home modernization, and the job resulted in a total of 18 incandescent fixtures carrying 39 sockets, plus 3 fluorescent valances and cornices. The total permanently installed wattage is 3,035. Before improvement, the home had 10 fixtures carrying 14 sockets, and a total installed wattage of 820.

In an eight-year old, two-bedroom home in the $10,000 to $12,000 price range, a lighting specialist sold an improved dining room fixture, fluorescent bracket lighting over both beds, soffit lighting over the kitche nsink, fluorescent lighting for kitchen work surfaces, and three fluorescent lights in the bath, increasing permanently installed wattage from 640 to 2,590. Three portables accounted for 600 additional watts connected.

A Wichita speculative builder agreed to put light conditioning into his model home for a 125-unit tract. These houses, in the $13,000 class, last year contained 12 fixtures for a total of about 1,000 watts of permanently installed lighting. The model home contained 25 fixture outlets and a total of 2,800 watts of permanently installed lighting. At first the builder planned to offer light conditioning as an extra, but viewer reaction during the first few weeks led him to order the electrician to install light conditioning in the entire tract.

Textile plants

(Continued from page 24)

the ground wire is enclosed.

Sealing of ducts or conduits extending from one area to another where temperature and humidity changes exist, reduces condensation of water vapor in conduits. This can be done with several compounds and fittings available on the market. This will limit condensation of water in the conduits, thus reducing the hazards of grounds or short circuits.

The job of revamping low voltage systems in existing textile plants is closely related to new work in so far as applying the principles of sound engineering practice are concerned. Principles do not change. They must be applied in a practical and economical way. Each plant is unique. Therefore a thorough knowledge of the existing system and the best obtainable information on future developments must be at hand. With this data it is possible to plan an integrated system to serve the plant and keep production at maximum efficiency. Without advanced

planning, the additions will resemble mushroom growth and the system will become one of disorder The objective should always be to provide a safe, economical, and dependable service to the wheels of industry.

Acknowledgement

The author wishes to acknowledge his appreciation to the many individuals and firms publishing information relative to this subject. They are too numerous to mention. The manufacturers of apparatus and materials have contributed eminently to our knowledge through research and development. The AIEE and many other engineering groups have done a great work in promoting the betterment of our industry. Credit is also due to those who work in the various plants and those in the construction industry who are continuing to find better ways of doing the job. To all of these the author wishes to say thank you.

Distributors in 1956

(Continued from page 25)

have that business and to be compensated for the risk he takes.

(5) The greatest operating problem for the electrical distributor this year will be one of tightening credit extended to customers. It is in this area that distributors can contribute some sound thinking and scientific planning toward stemming the tide of loose credit. There is a need in this industry to educate every employee to use good judgement in determining who is to receive—who is deserving of—such credit assistance.

(6) The development of advisory or counseling groups who can advise manufacturing management on the complex business of wholesale distribution would be helpful to industry today. Too few manufacturers make any provision on their boards of directors or staff for experienced distribution counselors. As a result, many needless and costly experiments through and around wholesale distribution have been conducted during the past few years—with unfortunate results.

These are the great problems that the wholesale distributing industry faces today. Meanwhile, the industry has an optimistic climate in which to work to solve them—a continued rise in sales and profits as forecast for 1956.

Electric heat

(Continued from page 19)

economical and a power company was willing to supply it. His patronage built up rapidly.

Cost is selling point

One doesn't have to spend much time convincing a home owner that this method of throwing warmth across the house is both desirable and workable. He only has to show that it is not expensive. Since it has already proved its value in a few scattered areas, it doesn't have to be started in any new locality as an experimental project. The contractor can easily get figures on costs that will make any hard-boiled prospect less hard-boiled. Thousands of users in the areas already being served can quote you their own experience figures. All one has to do is take the average kilowatt consumption of heating patrons in one of those areas, multiply it by the graded-down power rate in his own section. That will give him the low-down on how practical it will be for his own prospective users.

I talked to one of Bill's customers, a farmer whose new home he had wired five years before. This customer's highest heat bill for the hardest winter since installation was $110 for the winter. With this amount or less, he heats all six rooms at a comfortable temperature throughout the day. Two rooms are heated at the same temperature all night. Other rooms are off at night or greatly reduced.

Comparative cost

Before putting in electric heat this same customer had spent $75 heating only two rooms in another home with a coal heater. The cost of installing his electric system was $720 and the power rate for operating it is ¾ cent per kwh. He says his house is delightfully comfortable and he can easily get it hot enough to run him out.

After an electrical contractor gets a toe-hold in the heating business the best way to get a volume trade is to work with speculative builders, general contractors or subdivision developers. Bill made an early start with this type of work. The rate of construction going on all over the country makes it look promising for years to come. Bill gets a single contract for an entire group of six to 12 houses in one package. In the Donelson area alone, near Nashville, he has wired

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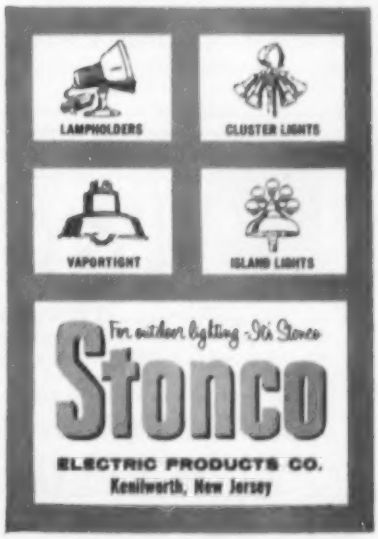

nearly 2,000 homes in the past five years.

He explains that there are both advantages and disadvantages in getting into this sort of mass construction. Among the advantages is the fact that it is a repeat business. If you give a general contractor or speculative builder satisfactory service on a few units he is in a position to use your services again and again. He may like your work so well that he won't even ask for competitive bids.

After getting established with a few volume builders of this kind you can count on giving your mechanics full or near full-time employment. You can order your heating supplies on a volume discount basis. You will handle so many housing units you can learn to figure costs very closely.

Bill started out in 1948 with four general contractors who had practically all the construction business sewed up at the time. However, the FHA will no longer confine its deals with just a handful of builders. That makes it a lot better for all the subcontractors. Bill now works with about 50 mass builders. They range all the way from shoestring operators up to big-business construction firms.

One of the disadvantages of selling your services to a speculative builder is that you have to figure your profit per unit much closer than if you are doing it for an owning builder who expects to occupy the residence. The speculative builder or general contractor wants to make his own profit as big as possible and the cheaper you will do a good job for him the more he will make.

If you are figuring this work for the occupying owner himself he is looking more to his own future comfort and convenience and the cost doesn't matter too much. You can induce him to add for his own convenience many heating and electric fixtures that a speculative builder wouldn't consider at all.

Another disadvantage is that a shaky general contractor or mass builder can cost you a lot of money if you don't size him up properly. Bill had just lost $390 on a job he did for one who went bankrupt on him. He has, however, learned a lot about this phase of his business and such a loss is rare.

Construction cost

Electrical contractors who expect to tie in with this rapidly developing form of service will find the consumer construction cost very reasonable. "Over the past few years," says Bill, "the average installation cost of electric heat to my customers has been about $100 per room. This is more reasonable than central heating with any other kind of fuel. And, what's more, electric heating requires no basement in the house.

"For the most economical use, every house that expects to get winter comfort from this source should be well insulated and weatherstripped. Storm windows and doors will cut costs still further, especially when the power rate is 1 cent per kwh or more.

"Another advantage on which you can sell your user prospect is that there is practically no upkeep at all on electric heat. There are no motors or running parts. On the Cable system there is practically no wear-out to the wires. On the wall heaters my company gives a year's guarantee on the heater as a whole and five years on the burner. But even at that, I have had practically no calls for follow-up servicing and none of my customers have spent more than a trivial amount for any sort of repair."

Training mechanics

Bill keeps 15 mechanics busy on his jobs. He trains his own men.

"I would rather start with a green man who knows nothing about the work he is undertaking than with a mechanic who has been working for several years," he said. "The green hand can be trained thoroughly in my methods and conditions of work. He doesn't have to unlearn a lot of things that won't do him any good on my jobs."

After talking with Bill, I checked on a few power cost figures in the Nashville area in order to give contractors in other sections a good yardstick with which to sell prospective users. On a cross-section survey of 526 homes in the Nashville and Davidson area the heat consumption of the average home in this survey was 14,100 kwh per winter, at a total cost of $105.75 figured at ¾ cent per kwh. If the graded-down rate in your section is 1 cent per kwh, the average consumption per home at the above average would cost $141; at 1½ cent per kwh it would come to $211.50.

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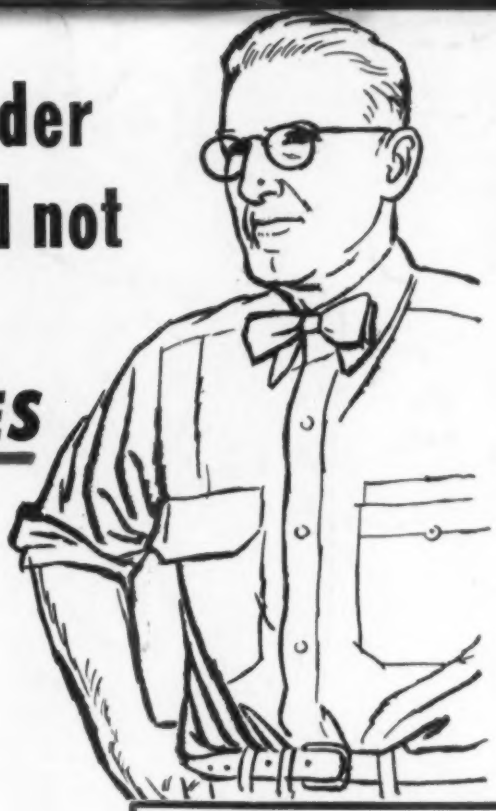
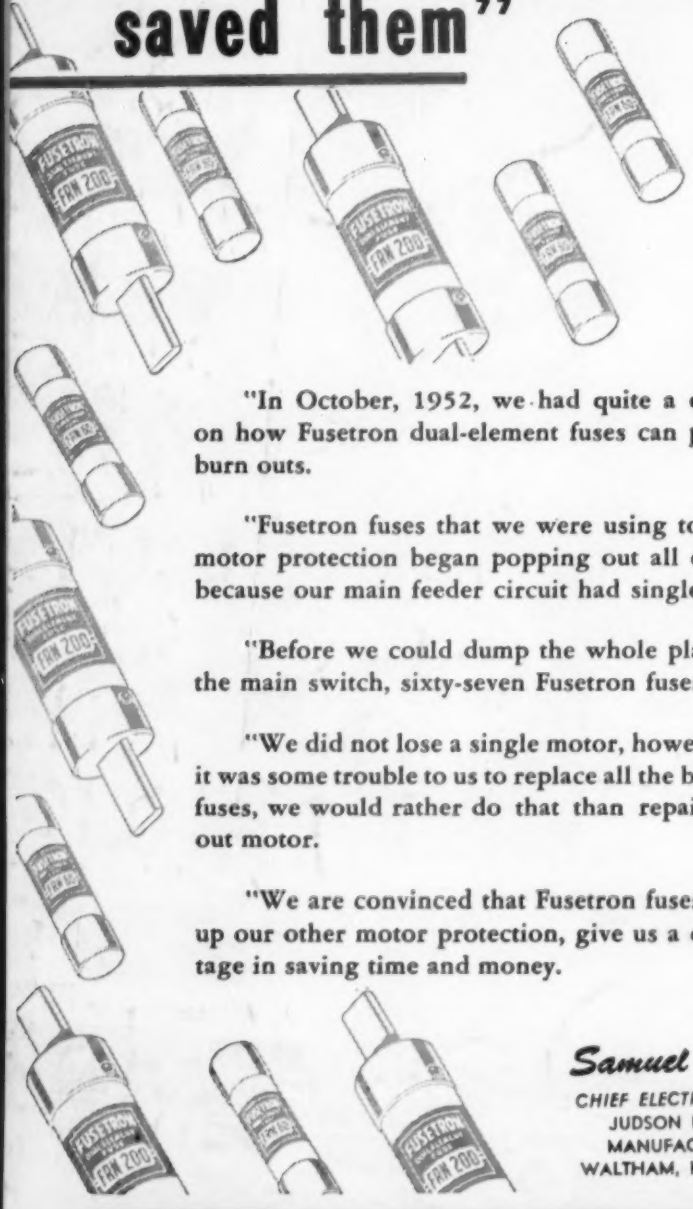
"When our main feeder single-phased, we did not lose a motor — FUSETRON DUAL-ELEMENT FUSES saved them"





"In October, 1952, we had quite a demonstration on how Fusetron dual-element fuses can prevent motor burn outs.

"Fusetron fuses that we were using to back up our motor protection began popping out all over the plant because our main feeder circuit had single-phased.

"Before we could dump the whole plant by pulling the main switch, sixty-seven Fusetron fuses had opened.

"We did not lose a single motor, however, and while it was some trouble to us to replace all the blown Fusetron fuses, we would rather do that than repair one burned out motor.

"We are convinced that Fusetron fuses used to back up our other motor protection, give us a distinct advantage in saving time and money.

Samuel T. Craig
CHIEF ELECTRICAL ENGINEER
JUDSON L. THOMSON
MANUFACTURING CO.
WALTHAM, MASSACHUSETTS

And Fusetron fuses do more than protect motors against burnouts.

They offer maximum safety because their 100,000 amp. interrupting ratin they help to increase production becau they abolish needless blows; and they c maintenance costs because they are mai tenance free.

When an electrical fault occurs th prevent further damage to equipment opening and warning of danger.

START SAVING WITH FUSETRON FUSES

One needless shutdown . . . one l motor . . . one destroyed switch or pa . . . one burned out solenoid . . . may c you far more than replacing every or nary fuse with a FUSETRON dual-e ment fuse now!

Blowing time charts and more infor tion are available on Fusetron dual-e ment fuses. Write for Bulletin FIS.

Play Safe! install FUSETRON dual-element Fuses and BUSS Hi-Cap Fuses throughout entire Electrical System!

FUSETRON — TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION — BUSS

BUSSMANN MFG. CO. (Division of McGraw Electric Co.) **University at Jefferson, St. Louis 7, Mo.**